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A KEY TO  
MINERAL GROUPS, SPECIES AND VARIETIES



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A KEY TO  
MINERAL GROUPS  
SPECIES AND VARIETIES

BY

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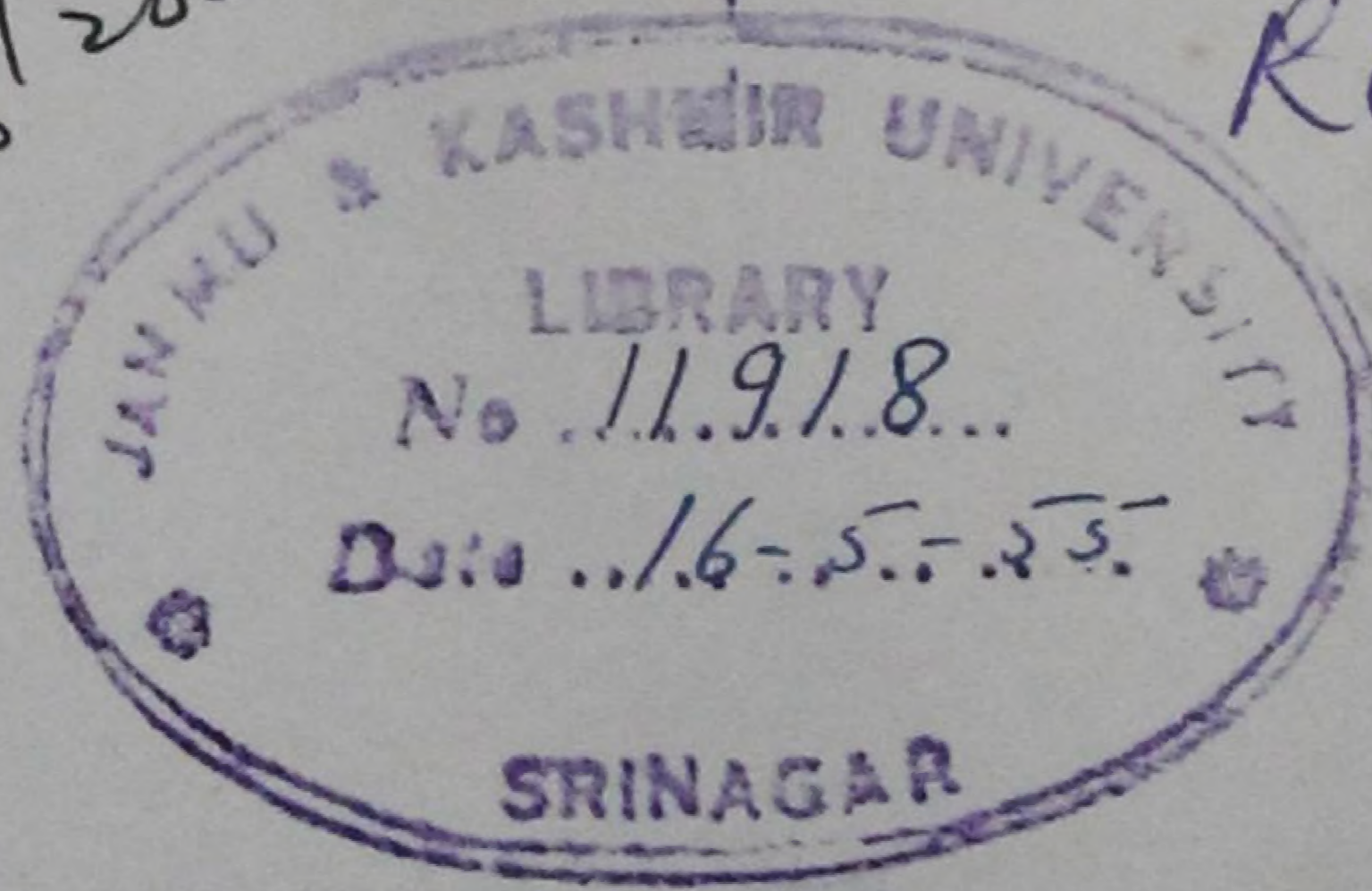
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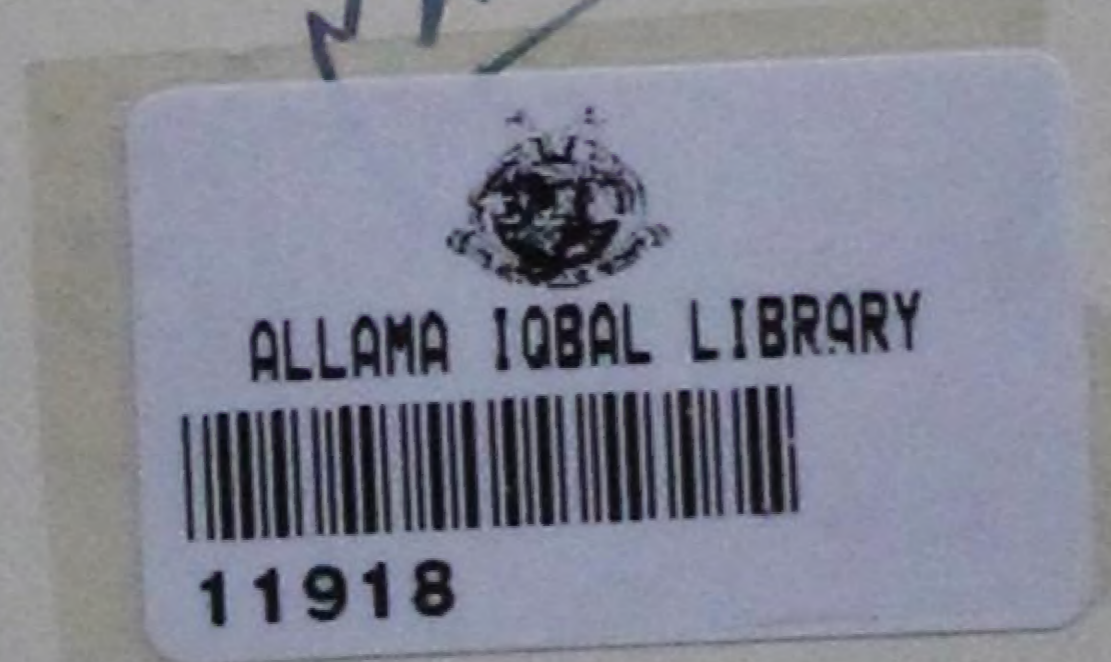
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## INTRODUCTION.

FOR more than a generation Dana's System of Mineralogy has been the standard work of reference for mineralogists throughout the English-speaking world. Since the publication of the seventh edition in 1896, however, seven or eight hundred new mineral names have appeared in journals devoted to the science, and although the three Appendices to Dana published in 1899, 1909 and 1915 have given details of many of them, in the absence of a consolidated edition reference to this work has become more complex. Furthermore, there are still some hundreds of names not appearing in Dana at all, whilst many of the constitutional formulæ given by him need revision, and an immense mass of new and important data is available regarding crystalline structure, specific gravity and refractive indices, the three most valuable diagnostic properties of minerals.

To supplement the information available in Dana the student may refer to such compendiums as Hintze's "Handbuch der Mineralogie," or Doelter's "Handbuch der Mineralchemie," both of which are still incomplete, and very voluminous; or to Larsen's "Nonopaque Minerals," Winchell's "Optical Mineralogy," or one of the several modern text-books on the opaque minerals. All of them, however, are incomplete in some particular, and the task of finding the most recent data regarding any given mineral becomes more and more arduous, even when a good library is available, and more and more impossible when it is not.

Feeling, in his own professional career, the need of a rapid and simple means of ascertaining the composition, chief properties of diagnostic value, and the best source of detailed information regarding all, more particularly the newer, mineral groups, species and varieties, the author many years ago began compiling a dictionary of mineral names. This has been regularly brought up to date, as new names appeared, or new data affecting older names, and is now offered to the public in the present form in the certain belief that it will be found a valuable *vade mecum* to every one interested in the study of minerals.

The literature of mineralogy is cumbered with hundreds of unnecessary names, applied either without preliminary search to new occurrences of minerals already described and named, or to insignificant variations of established species, such as are best defined by the use of adjectives. For example, more than forty names have been applied to members of the amphibole group, and of these quite twenty-five are redundant. The majority of such names, particularly those that show signs of dying out of the literature, or stand only for minute differences in structure, colour or other unessential characters, have been omitted purposely. No purely organic compounds have been included, as their study belongs to the domain of organic chemistry,



especially botanical chemistry, rather than that of mineralogy. The only natural inorganic substances (apart from rocks) which have been omitted are those elements and compounds which are gaseous at normal temperatures and pressures, such as  $O_2$ ,  $N_2$ ,  $SiF_4$  ("Proidonite"),  $CO_2$ ,  $SO_2$ , etc.

Diacritical marks in names originating in foreign countries have been eliminated as entirely unnecessary and out of place in a work in the English language. A science which can assimilate names from a Greek or Russian source without such aids can very well do the same with words derived from Czech, Magyar or Swedish. The Swedish "å" has been transliterated as "o" following the deliberate example of Sven Hedin.

In using this Index, one should remember that the chemical constitutions of many of the rare minerals are only approximately known, whilst those of some of the common minerals are still liable to amendment. In particular, those of individual zeolites must be considered as only tentative, in view of our imperfect knowledge of the laws of base exchange.

The constitutional formulæ have been reduced to their simplest terms, omitting all common isomorphous replacements (which have been separately tabulated on page viii) except where our knowledge of the mineral leaves a doubt as to which are the essential or predominant constituents. Usually the condensed form of the formula has been given, e.g.  $NaAlSi_3O_8$ , instead of  $Na_2O \cdot Al_2O_3 \cdot 6SiO_2$ , and  $Ag_3AsS_3$ , instead of  $3Ag_2S \cdot As_2S_3$ . The longer form has only been used where it appeared to be more illuminating.

The published specific gravities of certain minerals are obviously incorrect. The low figure given for several metallic minerals is probably due to invisible inclusions of gangue in the comparatively large masses of mineral required for its determination. As far as possible, such figures have been corrected by reference to the recorded specific gravities of the artificial compounds, or by calculation from those of other isomorphous minerals.

Under refractive index is given a single figure when the mineral is isotropic, or when only an approximate mean figure is available. In the case of uniaxial and biaxial minerals, for which full data have been published, the average highest and lowest correlated indices are given, so that simple subtraction yields the average birefringence.

A list of the main sources from which the author has drawn his material (apart from his own observations) is given on a subsequent page. To the individual authors therein mentioned he desires to express his grateful appreciation, as without their labours the preparation of a concise work of reference would have been impossible.

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## CONTRACTIONS.

|     |                     |         |   |
|-----|---------------------|---------|---|
| Cr. | Crystalline System. | G.      | Specific Gravity.                       |
| Is. | Isometric.          | N.      | Refractive indices.                     |
| Tt. | Tetragonal.         | Op.     | Opaque.                                 |
| Hx. | Hexagonal.          | AO.     | Almost opaque.                          |
| Or. | Orthorhombic.       | Var.    | Variety.                                |
| Mc. | Monoclinic.         | Mixt.   | Physical mixture.                       |
| Tc. | Triclinic.          | Ferrug. | Ferruginous, containing divalent iron.  |
| Am. | Amorphous.          | Ferrif. | Ferriferous, containing trivalent iron. |

## ISOMORPHOUS REPLACEMENTS FOUND IN MINERALS.

*N.B.*—The common replacements are unbracketed, the rarer, and only partial ones, are bracketed.

## I. SIMPLEX REPLACEMENTS.

|   |   |
|---|---|
| Ag : Au, (Cu)   | Mo : (W)  |
| Al : Fe <sup>'''</sup> , Mn <sup>'''</sup> , (Ti <sup>'''</sup> , B, Cr, Ce, Y) | Na : K, (Li)  |
| As : P, Sb, Bi, (V)   | Nb : Ta   |
| Au : Ag   | Ni : Co, Fe, (Mg)   |
| B : (Al)  | P : (As, V)   |
| Ba : Ca, Sr, (Pb)   | Pb : (Cu, Ca)   |
| Be : Ca, (Fe)   | Pt : Fe, (Rh, Ir, Pd, Cu)                                   |
| Bi : Sb, (As)   | S : (Se, Te)  |
| Br : Cl, (I)  | Sb : As, Bi   |
| Ca : Mg, Sr, Fe <sup>''</sup> (Mn <sup>''</sup> , Ba, Zn, Pb, Co)               | Se : S, Te  |
| Cd : Zn   | Si : Ti, (Zr, Th)   |
| Ce : La, Nd, Pr, (Y, Er)  | Sn : (Ge)   |
| Cl : Br, (I)  | Sr : Ca, Ba   |
| Co : Ni, Fe <sup>''</sup>   | Ta : Nb   |
| Cr : Al, Fe <sup>'''</sup>  | Te : Se, (S)  |
| Cu : Zn, (Ag, Ca)   | Th : U <sup>4</sup> , (Zr, Ti)                              |
| F : OH, (Cl)  | Ti : (Zr, Th, U)  |
| Fe <sup>''</sup> : Mg, Mn <sup>''</sup> , (Co, Ni, Ca)                          | U <sup>4</sup> : Th, (Ti, Zr)                               |
| Fe <sup>'''</sup> : Mn <sup>'''</sup> , Al, (Cr, Ce, Y)                         | V : (P, As)   |
| K : Na, (Rb, Cs, Ag, NH <sub>4</sub> )  | W : (Mo)  |
| Li : Na   | Y : Er, (Yb, Ce, La)  |
| Mg : Fe <sup>''</sup> , Mn <sup>''</sup> , (Ca, Ni)                             | Zn : Fe <sup>''</sup> , Mn <sup>''</sup> , Ca, Cu, Cd, (Mg) |
| Mn <sup>''</sup> : Fe <sup>''</sup> , Ca, Co, (Mg, Zn)                          | Zr : Hf, Ti, Th, (U)  |

## II. COMPLEX REPLACEMENTS.

| <i>Valency. Group.</i> | <i>Replacements.</i>  | <i>Valency. Group.</i> | <i>Replacements.</i>   |
|------------------------|---|------------------------|--|
| 4                      | CaMg<br>Fe <sup>''</sup> <sub>2</sub><br>Mg <sub>2</sub><br>NaAl<br>NaFe <sup>'''</sup>   | 7                      | CaNb<br>CaTa<br>CeTi<br>Fe <sup>''</sup> Nb<br>Fe <sup>''</sup> Ta<br>Fe <sup>'''</sup> Ti<br>YTi  |
|                        | NaAl, NaFe <sup>'''</sup><br>NaFe <sup>'''</sup> , NaAl<br>NaAl, NaFe <sup>'''</sup><br>CaMg, Fe <sup>''</sup> <sub>2</sub> , Mg <sub>2</sub><br>CaMg, Fe <sup>''</sup> <sub>2</sub> , Mg <sub>2</sub>  |                        | YTi, CeTi<br>YTi, CeTi<br>CaNb(Ta), Fe <sup>''</sup> Nb(Ta)<br>CeTi, YTi, Fe <sup>'''</sup> Ti<br>CeTi, YTi, Fe <sup>'''</sup> Ti<br>Fe <sup>''</sup> Nb, Fe <sup>''</sup> Ta<br>CaNb(Ta), Fe <sup>''</sup> Nb(Ta) |
| 5                      | CaAl<br>NaSi  |                        |  |
|                        | NaSi<br>CaAl  | 8                      | BeAl <sub>2</sub><br>Ti <sub>2</sub><br>YNb<br>YTa   |
| 6                      | Al <sub>2</sub><br>CaSi<br>CaTi<br>CaU <sup>4</sup><br>Ce <sub>2</sub><br>CaZr<br>Fe <sup>'''</sup> <sub>2</sub><br>Fe <sup>''</sup> Si<br>Fe <sup>''</sup> Ti<br>MgSi<br>Y <sub>2</sub>  |                        | Mg <sub>2</sub> Si<br>YNb, YTa<br>Ti <sub>2</sub> , U <sup>4</sup> <sub>2</sub><br>Ti <sub>2</sub> , U <sup>4</sup> <sub>2</sub>   |
|                        | MgSi, CaSi<br>Al <sub>2</sub><br>Y <sub>2</sub> , Ce <sub>2</sub><br>Y <sub>2</sub><br>CaTi, CaZr<br>Ce <sub>2</sub> , Y <sub>2</sub><br>Fe <sup>''</sup> Si, Fe <sup>''</sup> Ti<br>Fe <sup>'''</sup> <sub>2</sub><br>Fe <sup>''</sup> Si<br>Fe <sup>''</sup> Ti<br>Al <sub>2</sub><br>CaTi, CaU <sup>4</sup> , CaZr | 12                     | Fe <sup>''</sup> Nb <sub>2</sub><br>Fe <sup>''</sup> Ta <sub>2</sub><br>Mn <sup>''</sup> Nb <sub>2</sub><br>Mn <sup>''</sup> Ta <sub>2</sub><br>Ti <sub>3</sub>  |
|                        |   |                        | Ti <sub>3</sub><br>Ti <sub>3</sub><br>Ti <sub>3</sub><br>Ti <sub>3</sub><br>Fe <sup>''</sup> Nb <sub>2</sub> (Ta <sub>2</sub> ),<br>Mn <sup>''</sup> Nb <sub>2</sub> (Ta <sub>2</sub> )                            |

## A KEY TO MINERAL GROUPS, SPECIES AND VARIETIES.

| <i>Name and Reference.</i>               | <i>Composition.</i>   | <i>Cr.</i> | <i>G.</i> | <i>N.</i>    |
|--|---|------------|-----------|--------------|
| <b>Acanthite</b><br>D. 57, AM. 12        | = Argentite   | —          | —         | —            |
| <b>Achroite</b><br>D. 426, H. 2 (1)      | = Colourless Dravite or Elbaite   | —          | —         | —            |
| <b>Acmite</b><br>D. 326, W. 192          | $\text{NaFe}''(\text{SiO}_3)_2$   | Mc         | 3.50      | 1.820, 1.765 |
| <b>Actinolite</b><br>D. 338, W. 210      | Ferrug. var. of Tremolite   | Mc         | 3.15      | 1.657, 1.628 |
| <b>Adamite</b><br>D. 563, W. 132         | $\text{Zn}_2(\text{OH})\text{AsO}_4$  | Or         | 4.45      | 1.758, 1.708 |
| <b>Adelite</b><br>W. 133, Dl. 3 (1)      | $\text{CaMg}(\text{OH})\text{AsO}_4$  | Mc         | 3.75      | 1.731, 1.712 |
| <b>Aegyrite</b><br>W. 192, H. 2          | = Acmite  | —          | —         | —            |
| <b>Aenigmatite</b><br>D. 343, W. 216     | $\text{Na}(\text{Al}, \text{Fe})\text{SiTiO}_6 + \text{Fe}''_2\text{Si}_2\text{O}_6$              | Tc         | 3.80      | 1.803, 1.797 |
| <b>Aerinite</b><br>W. 381, H. 2          | Comp. unknown. A blue ferrif. Chlorite  | Mc         | ?         | ?            |
| <b>Aeschynite</b><br>D. 532, Dl. 3 (1)   | ? $\text{Ce}(\text{Ti}, \text{Th})_2\text{NbO}_8 + (\text{Fe}, \text{Ca})\text{TiNb}_2\text{O}_8$ | Or         | 5.20      | 2.23         |
| <b>Afwillite</b><br>W. 231, MM. 20       | $\text{Ca}_3\text{Si}_2\text{O}_7 \cdot 3\text{H}_2\text{O}$                                      | Mc         | 2.63      | 1.634, 1.617 |
| <b>Agalmatolite</b><br>D. 458, AM. 10    | $\text{Al}_2\text{O}_3 \cdot 4\text{SiO}_2 \cdot \text{H}_2\text{O}^*$                            | —          | —         | —            |
| <b>Agate</b><br>D. 210, BPS.             | Variegated Chalcedony   | —          | —         | —            |
| <b>Agnolite</b><br>D. Ap. 2, Dl. 2 (1)   | $\text{H}_2\text{Mn}_3(\text{SiO}_3)_4 \cdot \text{H}_2\text{O}$                                  | Tc         | 3.05      | ?            |
| <b>Agricolite</b><br>D. 373, W. 236      | $\text{Bi}_4(\text{SiO}_4)_3$   | Mc         | 6         | 2.00         |
| <b>Aguilarite</b><br>Dl. 4 (1), H. 1 (1) | $\text{Ag}_4\text{SSe}$   | Is         | 7.60      | Op           |
| <b>Aikinite</b><br>D. 138, Dl. 4 (1)     | $\text{CuPbBiS}_3$  | Or         | 6.4       | Op           |
| <b>Akermanite</b> †<br>AJS. 1924, W. 268 | $\text{Ca}_2\text{MgSi}_2\text{O}_7$  | Tt         | 3.20      | 1.639, 1.633 |

\* D. and M. T. say Agalmatolite is either muscovite, tale or pyrophyllite.

† Or Okermanite.

| <i>Name and Reference.</i>                          | <i>Composition.</i>  | <i>Cr.</i> | <i>G.</i> | <i>N.</i>    |
|---|--|------------|-----------|--------------|
| <b>Akrochordite</b><br>BSF. 46, MA. 2               | $(\text{Mn, Mg})_5(\text{OH})_4(\text{AsO}_4)_2 \cdot 4\text{H}_2\text{O}$ | Mc         | 3.20      | ?            |
| <b>Alabandite</b><br>D. 63, DL. 4 (1)               | MnS  | Is         | 3.95      | 2.70         |
| <b>Alabaster</b><br>D. 746                          | Ornamental form of Gypsum  | —          | —         | —            |
| <b>Alaite</b><br>MM. 20, D. Ap. 3                   | $\text{V}_2\text{O}_5 \cdot \text{H}_2\text{O}$                            | ?          | ?         | ?            |
| <b>Alamosite</b><br>W. 198, DL. 2 (1)               | $\text{PbSiO}_3$   | Mc         | 6.50      | 1.968, 1.947 |
| <b>Alaskaite</b><br>DL. 4 (1), MA. 3                | Mixture of Matildite and Galenobismutite                                   | —          | —         | —            |
| <b>Albite</b><br>D. 316, W. 328                     | $\text{NaAlSi}_3\text{O}_8$ ; also Ab to $\text{Ab}_5\text{An}_5^*$        | Tc         | 2.61      | 1.536, 1.525 |
| <b>Alexandrite</b><br>D. 242, BPS.                  | Green Chrysoberyl of gem quality   | —          | —         | —            |
| <b>Alexandrolite</b><br>DL. 2 (2), ZK. 28           | Chromiferous var. of Halloysite  | —          | —         | —            |
| <b>Algodonite</b><br>D. 38, AM. 14                  | $\text{Cu}_6\text{As}$   | Hx         | 7.60      | Op           |
| <b>Allactite</b><br>D. 578, DL. 3 (1)               | $\text{Mn}_7(\text{OH})_8(\text{AsO}_4)_2$                                 | Mc         | 3.85      | 1.784, 1.758 |
| <b>Allagite</b><br>W. 196, D. 335                   | Carbonated Rhodonite, doubtful species                                     | —          | —         | —            |
| <b>Allanite</b><br>D. 409, W. 358                   | $\text{H}(\text{Ca, Fe})_2(\text{Ce, Al})_3\text{Si}_3\text{O}_{13}$       | Mc         | 4.15      | 1.70, 1.67   |
| <b>Allemontite</b><br>D. 9, AM. 12                  | $\text{SbAs}_5$ . Slavik says Sb + As                                      | Hx         | 6.20      | Op           |
| <b>Alloclasite</b><br>D. 102, DL. 4 (1)             | $(\text{Co, Fe})(\text{As, Bi})\text{S}$                                   | Or         | 6.50      | Op           |
| <b>Allopalladium</b><br>D. 24, DL. 3 (2)            | Pd (doubtful species)  | Hx         | 11.5      | Op           |
| <b>Allophane</b><br>(Allophanite)<br>D. 498, AM. 10 | $\text{Al}_2\text{O}_3 \cdot \text{SiO}_2 \cdot 5\text{H}_2\text{O}$       | Am         | 1.85      | 1.48         |
| <b>Almandite</b><br>(Almandine)<br>D. 370, W. 261   | $\text{Fe}''_3\text{Al}_3(\text{SiO}_4)_3$                                 | Is         | 4.25      | 1.83         |
| <b>Alstonite</b><br>D. 278                          | = Bromlite   | —          | —         | —            |
| <b>Altaite</b><br>D. 46, DL. 4 (1)                  | PbTe   | Is         | 8.20      | Op           |
| <b>Alumianite</b><br>W. 108, DL. 4 (2)              | ? $\text{Al}_2\text{O}(\text{SO}_4)_2$ . Probably = Alunite                | Hx         | 2.75      | 1.602, 1.583 |
| <b>Aluminite</b><br>D. 791, W. 110                  | $\text{Al}_2(\text{OH})_4\text{SO}_4 \cdot 7\text{H}_2\text{O}$            | Mc         | 1.65      | 1.470, 1.459 |

\* Ab =  $\text{NaAlSi}_3\text{O}_8$ ; An =  $\text{CaAl}_2\text{Si}_2\text{O}_8$ .

A KEY TO MINERAL GROUPS, SPECIES AND VARIETIES 3

| <i>Name and Reference.</i>                  | <i>Composition.</i>   | <i>Cr.</i> | <i>G.</i> | <i>N.</i>         |
|---|---|------------|-----------|-------------------|
| <b>Alumohydrocalcite</b><br>MA. 3, AM. 13   | $H_2CaAl_2(OH)_6(CO_2)_2 \cdot H_2O$  | Mc         | 2.23      | 1.570, 1.485      |
| <b>Alunite</b><br>D.800, DL. 4 (2)          | (1) $KAl_3(OH)_6(SO_4)_2$<br>(2) Group name incl. Argentojarosite, Jarosite, Natroalunite, etc. | Hx<br>—    | 2.60<br>— | 1.592, 1.572<br>— |
| <b>Alunogen</b><br>D. 775, DL. 4 (2)        | $Al_3(SO_4)_3 \cdot 16H_2O$   | Mc         | 1.70      | 1.485, 1.475      |
| <b>Alurgite</b><br>D. 462, DL. 2 (2)        | Mg and Mn bearing var. of Phengite  | Mc         | 2.95      | ?                 |
| <b>Amalgam, Gold-</b><br>D. 13, DL. 3 (2)   | $Au_2Hg_2$ *  | Is         | 15.5      | Op                |
| <b>Amalgam, Silver-</b><br>D. 17, DL. 3 (2) | $AgHg$ *  | Is         | 14.0      | Op                |
| <b>Amarantite</b><br>D. 787, DL. 4 (2)      | $Fe^{III}(OH)SO_4 + 3H_2O$  | Tc         | 2.15      | 1.611, 1.510      |
| <b>Ambatoarinite</b><br>W. 89, LM. 1        | $Sr_3Ce_{10}O_2(CO_2)_{17}$ ; same as An-cylite ?   | Or         | ?         | 1.74, 1.66        |
| <b>Amblygonite</b><br>D. 559, DL. 3 (1)     | (1) $LiAlFPO_4$<br>(2) Group name incl. Durangite, Fremontite and Montebasite                   | Tc<br>—    | 3.05<br>— | 1.598, 1.579<br>— |
| <b>Ameletite</b><br>MM. 22, AM. 15          | $Na_{27}Al_{24}ClSi_{24}O_{192}$  | Hx         | ?         | ?                 |
| <b>Amesite</b><br>W. 381, D. 470            | $H_4Mg_2Al_7SiO_9$  | Mc         | 2.80      | 1.583, 1.597      |
| <b>Amethyst</b><br>D. 210, AM. 10           | Purple quartz of gem quality  | —          | —         | —                 |
| <b>Ammoniojarosite</b><br>AM. 12, MA. 3     | $NH_4Fe^{III}_2(OH)_6(SO_4)_2$  | Hx         | ?         | 1.800, 1.750      |
| <b>Amosite</b><br>MM. 18, AM. 13            | Fibrous form of Cummingtonite or Feranthophyllite   | Mc or Or   | ?         | 1.69, 1.66        |
| <b>Ampangabeite</b><br>LM. 1, W. 161        | $UO_2 \cdot Fe_2O_3 \cdot 4Nb_2O_5 \cdot xH_2O$   | Or         | 4.0       | 2.13              |
| <b>Amphibole</b><br>D. 337, W. 198          | Group name incl. Anthophyllite, Tremolite, Hornblende, etc.                                     | —          | —         | —                 |
| <b>Analbite</b><br>W. 315, MA. 3            | Hypothetical $NaAlSi_3O_8$ in Anorthoclase  | Tc         | —         | —                 |
| <b>Analcite</b><br>D. 450, W. 257           | $NaAl(SiO_3)_2 \cdot H_2O$  | Is ?       | 2.25      | 1.484             |
| <b>Anapaite</b><br>W. 127, DL. 3 (1)        | $Ca_2Fe^{II}(PO_4)_4 \cdot 4H_2O$   | Tc         | 2.85      | 1.649, 1.602      |
| <b>Anatase</b><br>D. 252, H. 1 (2)          | = Octahedrite   | —          | —         | —                 |

\* Other ratios of Au to Hg, and Ag to Hg, have been recorded : these may represent other mineral species, or simply mixtures.

4 A KEY TO MINERAL GROUPS, SPECIES AND VARIETIES

| <i>Name and Reference.</i>             | <i>Composition.</i>   | <i>Cr.</i> | <i>G.</i> | <i>N.</i>    |
|--|---|------------|-----------|--------------|
| <b>Anauxite</b><br>AM. 13, DL. 2 (2)   | $2\text{H}_2\text{O} \cdot \text{Al}_2\text{O}_3 \cdot 3\text{SiO}_2$   | Mc         | 2.2       | 1.564, 1.559 |
| <b>Ancylite</b><br>W. 89, MA. 3        | $\text{Sr}_3\text{Ce}_4(\text{OH})_4(\text{CO}_3)_7 \cdot 3\text{H}_2\text{O}$                                      | Or         | 3.95      | 1.735, 1.625 |
| <b>Andalusite</b><br>D. 398, DL. 2(2)  | $\text{Al}_2\text{SiO}_5$   | Or         | 3.15      | 1.643, 1.632 |
| <b>Andesine</b><br>D. 316, W. 332      | Calcareous var. of Albite, $\text{Ab}_7\text{An}_2$<br>to $\text{Ab}_5\text{An}_5$ *                                | Tc         | 2.67      | 1.557, 1.550 |
| <b>Andorite</b><br>DL. 4 (1), DAp. 1   | $\text{AgPbSb}_3\text{S}_6$   | Or         | 5.40      | Op           |
| <b>Andradite</b><br>D. 370, W. 263     | $\text{Ca}_3\text{Fe}''_2(\text{SiO}_4)_3$  | Is         | 3.75      | 1.895        |
| <b>Andrewsite</b><br>DL. 3 (1), MT     | $3\text{CuO} \cdot 2\text{FeO} \cdot 6\text{Fe}_2\text{O}_3 \cdot 4\text{P}_2\text{O}_5 \cdot 11\text{H}_2\text{O}$ | ?          | 3.50      | ?            |
| <b>Angelardite</b><br>LF. 4, MM. 16    | $\text{Fe}''_7(\text{OH})_2(\text{PO}_4)_4 \cdot 8\text{H}_2\text{O}$   | Or ?       | 2.75      | 1.730, 1.710 |
| <b>Anglesite</b><br>D. 721, W. 101     | $\text{PbSO}_4$   | Or         | 6.30      | 1.895, 1.878 |
| <b>Anhydrite</b><br>D. 722, DL. 4 (2)  | $\text{CaSO}_4$   | Or         | 2.95      | 1.614, 1.570 |
| <b>Ankerite</b><br>D. 271, W. 75       | Ferruginous var. of Dolomite  | Hx         | 3.05      | 1.721, 1.526 |
| <b>Annabergite</b><br>D. 602, W. 127   | $\text{Ni}_3(\text{AsO}_4)_2 \cdot 8\text{H}_2\text{O}$   | Mc         | 3.05      | 1.687, 1.622 |
| <b>Annerodite</b><br>D. 530, DL. 3 (1) | Mixture of Samarskite and Columbite   | —          | —         | —            |
| <b>Annite</b><br>D. 462, W. 366        | $\text{H}_2\text{KFe}''_3\text{Al}(\text{SiO}_4)_3$   | Mc         | 3.35      | 1.690, 1.630 |
| <b>Anomite</b><br>D. 462, W. 366       | Opt. var. of Biotite or Zinnwaldite   | Mc         | 3.1       | ?            |
| <b>Anorthite</b><br>D. 320, W. 339     | $\text{CaAl}_2(\text{SiO}_4)_2$ also An to $\text{An}_5\text{Ab}_5$ *   | Tc         | 2.75      | 1.588, 1.576 |
| <b>Anorthoclase</b><br>D. 315A, W. 325 | $(\text{Na}, \text{K})\text{AlSi}_3\text{O}_8$ , probably potass.<br>var. of Analcite                               | Tc         | 2.58      | 1.529, 1.523 |
| <b>Anthophyllite</b><br>D. 337, MA. 4  | $\text{H}_2\text{Mg}_7(\text{SiO}_2)_8$   | Or         | 2.90      | 1.600, 1.585 |
| <b>Antigorite</b><br>W. 377, DL. 2 (1) | $\text{H}_4\text{Mg}_3\text{Si}_3\text{O}_9$  | Mc         | 2.55      | 1.57, 1.56   |
| <b>Antimonite</b><br>D. 28             | = Stibnite  | —          | —         | —            |
| <b>Antimony</b><br>D. 10, DL. 3 (1)    | Sb  | Hx         | 6.70      | Op           |
| <b>Antiperthite</b><br>ZK, 71, MA. 3   | Plagioclase with parallel inclusions<br>of Microcline   | —          | —         | —            |

\* An =  $\text{CaAl}_2\text{Si}_2\text{O}_8$ ; Ab =  $\text{NaAlSi}_3\text{O}_8$ .

A KEY TO MINERAL GROUPS, SPECIES AND VARIETIES 5

| <i>Name and Reference.</i>                  | <i>Composition.</i>  | <i>Cr.</i> | <i>G.</i> | <i>N.</i>    |
|---|--|------------|-----------|--------------|
| <b>Antlerite</b><br>W. 104, Dl. 4 (2)       | $\text{Cu}_3(\text{OH})_4\text{SO}_4$  | Or         | 3.90      | 1.785, 1.730 |
| <b>Apatite</b><br>D. 549, Dl. 3 (1)         | (1) $\text{Ca}_5\text{F}(\text{PO}_4)_3$<br>(2) Group name incl. Chlorapatite, Mimetite, Pyromorphite, Vanadinite, Voelckerite, etc. | Hx         | 3.20      | 1.636, 1.633 |
| <b>Apatite, Chlor-</b><br>D. 549, Dl. 3 (1) | See Chlorapatite   | —          | —         | —            |
| <b>Aphrosiderite</b><br>W. 376, Dl. 2 (3)   | Magnesian var. of Daphnite   | Mc         | 2.90      | 1.631, 1.629 |
| <b>Aphthitalite</b><br>W. 98, Dl. 4 (2)     | $(\text{Na}, \text{K})_2\text{SO}_4$   | Hx         | 2.70      | 1.498, 1.490 |
| <b>Apjohnite</b><br>D. 770, Dl. 4 (2)       | $\text{Mn}''\text{Al}_2(\text{SO}_4)_4 \cdot 22\text{H}_2\text{O}$   | Mc         | 1.80      | 1.482, 1.478 |
| <b>Apophyllite</b><br>Dl. 2 (1), W. 241     | $\text{H}_2\text{KCa}_4(\text{F}, \text{OH})(\text{SiO}_3)_5 \cdot 4\text{H}_2\text{O}$  | Tt         | 2.35      | 1.54 *       |
| <b>Aquamarine</b><br>BPS., Dl. 2 (2)        | Pale green or blue Beryl of gem quality  | Hx         | 2.70      | 1.585, 1.578 |
| <b>Aragonite</b><br>D. 277, W. 81           | (1) $\text{CaCO}_3$<br>(2) Group name incl. Cerussite, Strontianite, Witherite   | Or         | 2.93      | 1.685, 1.530 |
| <b>Arakawaite</b><br>W. 136, MA. 1          | $\text{Cu}_2\text{Zn}(\text{OH})_3\text{PO}_4 \cdot 2\text{H}_2\text{O}$   | Mc         | 3.10      | 1.658, 1.618 |
| <b>Aramayoite</b><br>MA. 3, MM. 21          | $\text{Ag}(\text{Sb}, \text{Bi})\text{S}_2$  | Tt         | 5.60      | Op.          |
| <b>Arandisite</b><br>MA. 4, AM. 15          | $\text{Sn}_5\text{Si}_3\text{O}_{16} \cdot 4\text{H}_2\text{O}$  | Am         | 4.10      | 1.75         |
| <b>Ardennite</b><br>W. 406, Dl. 2 (3)       | $\text{H}_6\text{Mn}_5\text{Al}_5\text{Si}_5(\text{V}, \text{As})\text{O}_{28}$  | Or         | 3.65      | 1.915, 1.899 |
| <b>Arduinite</b><br>DAp. 3, MM. 16          | $\text{Na}_4\text{CaAl}_2\text{Si}_8\text{O}_{22} \cdot 8\text{H}_2\text{O}$   | ?          | 2.25      | ?            |
| <b>Arfvedsonite</b><br>D. 342, MA. 4        | $\text{HNaFe}''_2\text{Si}_4\text{O}_{11}$   | Tc         | 3.50      | 1.699, 1.694 |
| <b>Argentite</b><br>D. 42, Dl. 4 (1)        | (1) $\text{Ag}_2\text{S}$<br>(2) Group name incl. Hessite, Naumannite and Petzite  | Or         | 7.30      | Op           |
| <b>Argentojarosite</b><br>AM. 8, Dl. 4 (2)  | $\text{AgFe}'''_3(\text{OH})_6(\text{SO}_4)_2$   | Hx         | ?         | ?            |
| <b>Argentopyrite</b><br>Dl. 4 (1), MT.      | $\text{AgFe}_3\text{S}_5$  | Or         | 5.5       | Op           |
| <b>Argyrodite</b><br>D. 163, Dl. 4 (1)      | $\text{Ag}_8\text{GeS}_6$  | Is         | 6.25      | Op           |
| <b>Arizonite</b><br>W. 69, Dl. 3 (1)        | $\text{Fe}'''_2(\text{TiO}_3)_3$   | Mc         | 4.25      | 2.62         |

\* Birefringence 0.000 to 0.004 for Na light.



| <i>Name and Reference.</i>                 | <i>Composition.</i>  | <i>Cr.</i>  | <i>G.</i> | <i>N.</i>    |
|--|--|-------------|-----------|--------------|
| <b>Armangite</b><br>ZK. 61, MA. 1          | $Mn''_3(AsO_3)_2$  | Hx          | 4.25      | 1.86         |
| <b>Arrojadite</b><br>D. 544B, MA. 3        | $Na_3Fe''_6(PO_4)_5$   | Mc          | 3.60      | 1.700, 1.693 |
| <b>Arsenic</b><br>D. 8, Dl. 3 (1)          | As   | Hx          | 5.75      | Op           |
| <b>Arseniopleiite</b><br>D. 582, W. 150    | $(Mn, Ca, Pb)_9Mn'''_2(OH)_6(AsO_4)_6$                                       | Hx          | ?         | 1.803, 1.794 |
| <b>Arsenosiderite</b><br>D. 577, W. 149    | $Ca_3Fe'''_4(OH)_9(AsO_4)_3$   | Tc or<br>Hx | 3.6       | 1.870, 1.792 |
| <b>Arsenoferrite</b><br>Dl. 4 (1), AM. 15  | $FeAs_2$   | Is          | 6.40      | Op           |
| <b>Arsenolamprite</b><br>Dl. 3 (1), AM. 13 | Probably imp. Arsenic  | —           | —         | —            |
| <b>Arsenolite</b><br>D. 213, W. 42         | $As_2O_3$  | Is          | 3.70      | 1.755        |
| <b>Arsenopyrite</b><br>D. 98, Dl. 4 (1)    | $FeAsS$  | Or          | 6.05      | Op           |
| <b>Artinite</b><br>W. 86, H. 1 (3)         | $Mg_2(OH)_2CO_3 \cdot 3H_2O$   | Or          | 2.03      | 1.557, 1.489 |
| <b>Asbestos</b><br>D. 338, 481, etc.       | Trade name for Amosite, Chrysotile, Crocidolite, and other fibrous silicates | —           | —         | —            |
| <b>Asbolite</b><br>D. 269, Dl. 3 (2)       | Cobaltif. var. of Psilomelane  | Am          | ?         | Op           |
| <b>Ascharite</b><br>W. 94, DAp. 1          | = Szaibelyite  | —           | —         | —            |
| <b>Astrolite</b><br>W. 348, Dl. 2 (3)      | $H_2Na_2Fe''Al_2Si_5O_{16}$  | Or          | 2.80      | 1.597, 1.570 |
| <b>Astrophyllite</b><br>D. 514, W. 243     | $H_2(Na, K)_4Fe''_4ZrSi_4O_{17}$   | Or          | 3.35      | 1.733, 1.678 |
| <b>Atacamite</b><br>D. 193, Dl. 4 (3)      | $Cu_2(OH)_3Cl$   | Or          | 3.80      | 1.880, 1.831 |
| <b>Atelestite</b><br>D. 584, Dl. 3 (1)     | $2H_2O \cdot 3Bi_2O_3 \cdot As_2O_5$   | Mc          | 6.40      | 2.18, 2.14   |
| <b>Atelite</b><br>Dl. 4 (3), H. 1 (2)      | $Cu_3(OH)_4Cl_2 \cdot H_2O$  | ?           | ?         | ?            |
| <b>Atopite</b><br>D. 669, Dl. 3 (1)        | $Ca_2Sb_2O_7$  | Is          | 5.05      | 1.838        |
| <b>Auerlite</b><br>W. 52, Dl. 3 (1)        | $2ThO_2 \cdot 2SiO_2 \cdot P_2O_5 \cdot 4H_2O$                               | Tt          | 4.50      | 1.66, 1.65   |
| <b>Augelite</b><br>W. 141, Dl. 3 (1)       | $Al_2(OH)_3PO_4$   | Mc          | 2.70      | 1.588, 1.574 |
| <b>Augite</b><br>D. 325, W. 186            | $CaMgSi_2O_6 + Fe''Al_2SiO_6$  | Mc          | 3.4       | 1.719, 1.693 |
| <b>Aurichalcite</b><br>D. 290, H. 1 (3)    | $(Zn, Cu)_3(OH)_6(CO_3)_2$   | Mc          | 3.65      | 1.744, 1.655 |

A KEY TO MINERAL GROUPS, SPECIES AND VARIETIES 7

| <i>Name and Reference.</i>               | <i>Composition.</i>   | <i>Cr.</i> | <i>G.</i> | <i>N.</i>    |
|--|---|------------|-----------|--------------|
| <b>Autunite</b><br>D. 661, W. 144        | $\text{Ca}(\text{UO}_2)_2(\text{PO}_4)_2 \cdot 8\text{H}_2\text{O}$                   | Or         | 3.1       | 1.577, 1.553 |
| <b>Avogadrite</b><br>W. 34, DL. 4 (3)    | $(\text{K}, \text{Cs})\text{BF}_4$  | Or         | 2.60      | 1.325, 1.324 |
| <b>Awaruite</b><br>D. 25B, DL. 3 (2)     | $\text{FeNi}_2$   | Is         | 8.1       | Op           |
| <b>Axinite</b><br>D. 410, W. 253         | $\text{HFeCa}_2\text{Al}_2\text{B}(\text{SiO}_4)_4$                                   | Tc         | 3.25      | 1.682, 1.673 |
| <b>Azurite</b><br>D. 289, H. 1 (3)       | $\text{Cu}_2(\text{OH})_2(\text{CO}_3)_2$   | Mc         | 3.75      | 1.838, 1.730 |
| <b>Babingtonite</b><br>D. 336, DL. 2 (2) | $(\text{Ca}, \text{Fe})\text{SiO}_3 \cdot \text{Fe}^{+++}_2(\text{SiO}_3)_3$          | Tc         | 3.35      | 1.746, 1.713 |
| <b>Backstromite</b><br>DL. 3(2), MA. 1   | $\text{Mn}(\text{OH})_2$  | Or         | ?         | ?            |
| <b>Baddeleyite</b><br>W. 61, DL. 3 (1)   | $\text{ZrO}_2$  | Mc         | 5.75      | 2.20, 2.13   |
| <b>Bakerite</b><br>W. 97, DL. 2 (2)      | $\text{H}_{12}\text{Ca}_8\text{B}_{10}\text{Si}_6\text{O}_{21}$                       | ?          | 2.75      | 1.58         |
| <b>Baldaufite</b><br>MA. 2, AM. 11       | $(\text{Fe}, \text{Ca})_2(\text{PO}_4)_2 \cdot 3\text{H}_2\text{O}$                   | Mc         | ?         | ?            |
| <b>Balydonite</b><br>D. 629, W. 136      | $2\text{PbCu}(\text{OH})\text{AsO}_4 \cdot \text{H}_2\text{O}$                        | Mc ?       | 5.35      | 1.99, 1.95   |
| <b>Barbierite</b><br>W. 315, DAp. 3      | Artificial high temp. ( $>900^\circ$ )<br>form of $\text{NaAlSi}_3\text{O}_8$         | Mc         | —         | —            |
| <b>Bardolite</b><br>BSF. 47, MA. 2       | Var. of Hydrobiotite  | —          | 2.47      | —            |
| <b>Barite</b><br>D. 719, DL. 4 (2)       | (1) $\text{BaSO}_4$<br>(2) Group name incl. Anglesite and<br>Celestite                | Or         | 4.50      | 1.648, 1.636 |
| <b>Barkevikite</b><br>W. 215, DL. 2 (1)  | = Arfvedsonite  | —          | —         | —            |
| <b>Barrandite</b><br>D. 610, DL. 3 (1)   | Aluminous var. of Strengite   | Or         | 2.58      | 1.58         |
| <b>Barthite</b><br>W. 156, DL. 3 (1)     | $3\text{ZnO} \cdot \text{CuO} \cdot 3\text{As}_2\text{O}_5 \cdot 2\text{H}_2\text{O}$ | Mc ?       | 4.20      | 1.783, 1.770 |
| <b>Barylite</b><br>W. 164, AM. 15        | $\text{BaBe}_2\text{Si}_2\text{O}_7$  | Or         | 4.05      | 1.708, 1.695 |
| <b>Barysilite</b><br>D. 354, W. 164      | $\text{Pb}_2\text{Si}_2\text{O}_7$  | Hx         | 6.70      | 2.07, 2.05   |
| <b>Barytocalcite</b><br>D. 282, H. 1 (3) | $\text{BaCa}(\text{CO}_3)_2$  | Mc         | 3.70      | 1.686, 1.525 |
| <b>Bassetite</b><br>W. 144, DL. 4 (2)    | $\text{Ca}(\text{UO}_2)_2(\text{PO}_4)_2 \cdot 8\text{H}_2\text{O}$                   | Mc         | 3.10      | 1.580, 1.558 |
| <b>Bastite</b><br>W. 377, D. 324         | = Antigorite  | —          | —         | —            |
| <b>Bastnaesite</b><br>H. 1 (3), W. 87    | $(\text{Ce}, \text{La})\text{FCO}_2$  | Hx         | 5.0       | 1.818, 1.717 |

## 8 A KEY TO MINERAL GROUPS, SPECIES AND VARIETIES

| <i>Name and Reference.</i>                 | <i>Composition.</i>                           | <i>Cr.</i> | <i>G.</i> | <i>N.</i>    |
|--|---|------------|-----------|--------------|
| <b>Batchelorite</b><br>W. 370, JWAS. 7     | Doubtful species close to Leverrierite        | —          | —         | —            |
| <b>Baumhauerite</b><br>Dl. 4 (1), DAp. 2   | $Pb_4As_6S_{13}$                              | Me         | 5.35      | Op           |
| <b>Bauxite</b><br>Dl. 3 (2), H. 1 (2)      | = Gibbsite, or mixt. of Gibbsite and Diaspore | —          | —         | —            |
| <b>Bavenite</b><br>W. 405, Dl. 2 (2)       | $H_2Ca_3Al_2Si_6O_{19}$                       | Mc         | 2.72      | 1.583, 1.578 |
| <b>Bazzite</b><br>W. 232, MA. 1            | Sc, Si, O, etc.                               | Hx         | 2.80      | 1.626, 1.608 |
| <b>Beaumontite</b><br>AM. 10, MA. 2        | = Heulandite                                  | —          | —         | —            |
| <b>Beaverite</b><br>W. 115, Dl. 4 (2)      | $CuPbFe''_2(OH)_6(SO_4)_2 \cdot H_2O$         | Hx         | 4.35      | 1.85, 1.81   |
| <b>Beccarite</b><br>W. 51, H. 1 (2)        | Optical var. of Zircon                        | —          | —         | 1.982, 1.927 |
| <b>Bechilite</b><br>D. 709, W. 93          | Doubtful species, ? $CaB_4O_7 \cdot 4H_2O$    | ?          | 4.15      | 1.5          |
| <b>Becquerelite</b><br>W. 62, Dl. 4 (2)    | $UO_3 \cdot 2H_2O$                            | Or         | ?         | 1.882, 1.755 |
| <b>Beegerite</b><br>D. 155, Dl. 4 (1)      | $Pb_6Bi_2S_9$                                 | Is         | 7.25      | Op           |
| <b>Befanamite</b><br>LM. 3, MT             | Zirconiferous var. of Thortveitite            | —          | —         | —            |
| <b>Beidellite</b><br>MA. 3, AM. 11         | $Al_2(SiO_3)_3 \cdot 4H_2O$                   | Or         | ?         | 1.536, 1.495 |
| <b>Bellite</b><br>W. 118, DAp. 2           | Pb, $CrO_4$ , $AsO_3$                         | Hx         | 5.5       | 2.16, 2.14   |
| <b>Belonesite</b><br>D. 820, Dl. 4 (2)     | = Sellaite                                    | —          | —         | —            |
| <b>Bementite</b><br>D. 507, W. 227         | $2MnSiO_3 \cdot H_2O$ ?                       | Or         | 3.0       | 1.64, 1.61   |
| <b>Benitoite</b><br>W. 164, Dl. 3 (1)      | $BaTiSi_3O_9$                                 | Hx         | 3.65      | 1.803, 1.757 |
| <b>Benjaminite</b><br>MT. Dl. 4 (1)        | $Pb_2(Ag, Cu)_2Bi_4S_9$                       | Or         | ?         | Op           |
| <b>Bentonite</b><br>CDM. 1924*, MA. 3      | Impure Montmorillonite                        | —          | —         | —            |
| <b>Beraunite</b><br>D. 648, Dl. 3 (1)      | $2Fe_3'''(OH)_3(PO_4)_2 \cdot 5H_2O$          | Mc         | 2.95      | 1.815, 1.775 |
| <b>Beresofskite</b> †<br>Dl. 4 (2), MM. 19 | Magnesian var. of Chromite                    | —          | —         | —            |
| <b>Beresovite</b><br>DAp. 1, Dl. 4 (2)     | $6PbO \cdot 3CrO_3 \cdot CO_2$                | ?          | 6.70      | ?            |

\* Canada, Dept. of Mines Pamphlet, 1924; H. S. Spence, "Bentonite."

† Substituted for the earlier Beresovite, which name was pre-empted.

A KEY TO MINERAL GROUPS, SPECIES AND VARIETIES 9

| <i>Name and Reference.</i>                | <i>Composition.</i>  | <i>Cr.</i>  | <i>G.</i> | <i>N.</i>    |
|---|--|-------------|-----------|--------------|
| <b>Berthierine</b><br>LF. 1 and 3         | = Chamosite  | —           | —         | —            |
| <b>Berthierite</b><br>D. 119, DL 4 (1)    | FeSb <sub>2</sub> S <sub>4</sub>   | ?           | 4.1       | Op           |
| <b>Bertrandite</b><br>D. 422, W. 227      | H <sub>2</sub> Be <sub>4</sub> Si <sub>2</sub> O <sub>9</sub>  | Or          | 2.60      | 1.611, 1.584 |
| <b>Beryl</b><br>D. 344, DL 2 (2)          | Be <sub>3</sub> Al <sub>2</sub> (SiO <sub>2</sub> ) <sub>6</sub>   | Hx          | 2.70      | 1.578, 1.573 |
| <b>Beryllonite</b><br>D. 546, DL 3 (1)    | NaBePO <sub>4</sub>  | Or          | 2.85      | 1.561, 1.552 |
| <b>Berzelianite</b><br>D. 49, DL 4 (1)    | Cu <sub>2</sub> Se   | Is          | 6.60      | Op           |
| <b>Berzeliite</b><br>D. 538, DL 3 (1)     | (Ca, Mg) <sub>2</sub> (AsO <sub>4</sub> ) <sub>2</sub>   | Is          | 4.05      | 1.727        |
| <b>Betafite</b><br>LM. 1, W. 159          | CaO . UO <sub>2</sub> . Nb <sub>2</sub> O <sub>5</sub> . 2TiO <sub>2</sub> . 4H <sub>2</sub> O                             | Is          | 4.4       | 1.92         |
| <b>Beudantite</b><br>D. 680, W. 118       | (1) PbSO <sub>4</sub> . FeAsO <sub>4</sub> . 2Fe(OH) <sub>2</sub><br>(2) Group name incl. Corkite, Hinsdalite, Svanbergite | Hx          | 4.1       | 1.96, 1.95   |
| <b>Beyrichite</b><br>D. 76, DL 4 (1)      | Probably = Polydymite  | Is          | 4.70      | Op           |
| <b>Bieberite</b><br>D. 754, DL 4 (2)      | CoSO <sub>4</sub> . 7H <sub>2</sub> O  | Mc          | 1.95      | 1.489, 1.477 |
| <b>Bilinite</b><br>W. 116, DL 4 (2)       | Fe''Fe''' <sub>2</sub> (SO <sub>4</sub> ) <sub>4</sub> . 22H <sub>2</sub> O  | Mc          | 1.87      | 1.50         |
| <b>Bindheimite</b><br>D. 670, W. 155      | 2HPbSbO <sub>4</sub> . 3H <sub>2</sub> O   | Am<br>or Hx | 4.8       | 2.08, 1.82   |
| <b>Binnite</b><br>D. 123, DL 4 (1)        | = Tennantite *   | —           | —         | —            |
| <b>Biotite</b><br>D. 462, W. 366          | Group name incl. Annite, Eastonite, Monrepite, Phlogopite, Siderophyllite  | Mc          | —         | —            |
| <b>Bisbeeite</b><br>W. 231, DAp. 3        | CuSiO <sub>2</sub> . H <sub>2</sub> O  | Or          | ?         | 1.710, 1.615 |
| <b>Bischofite</b><br>D. 197, H. 1 (2)     | MgCl <sub>2</sub> . 6H <sub>2</sub> O  | Mc          | 1.60      | 1.528, 1.495 |
| <b>Bismite</b><br>D. 217, H. 1 (2)        | Bi <sub>2</sub> O <sub>3</sub> or Bi(OH) <sub>3</sub>  | Hx          | 4.35 ?    | 2.00, 1.82   |
| <b>Bismuth</b><br>D. 11, H. 1 (1)         | Bi   | Hx          | 9.75      | Op           |
| <b>Bismuthinite</b><br>D. 29, DL 4 (1)    | Bi <sub>2</sub> S <sub>3</sub>   | Or          | 7.10      | Op           |
| <b>Bismutite</b><br>D. 306, H. 1 (3)      | Bi <sub>2</sub> O(OH) <sub>2</sub> CO <sub>2</sub>   | ?           | 6.9       | 2.22, 2.17   |
| <b>Bimutoplagonite</b><br>DL 4 (1), MA. 1 | Pb <sub>3</sub> Bi <sub>9</sub> S <sub>17</sub>  | Or ?        | 5.35      | Op           |

\* Wherry, A. J. Sc. XI (1921).

10 A KEY TO MINERAL GROUPS, SPECIES AND VARIETIES

| <i>Name and Reference.</i>                     | <i>Composition.</i>   | <i>Cr.</i> | <i>G.</i> | <i>N.</i>    |
|--|---|------------|-----------|--------------|
| <b>Bismutosphaerite</b><br>D. 283, H. 1 (3)    | $\text{Bi}_2\text{O}_2\text{CO}_3$  | Tt or Hx   | 7.4       | 2.13, 1.94   |
| <b>Bismutotantalite</b><br>MM. 22, AM. 15      | $\text{BiTaO}_4$  | Or         | 8.30      | Op           |
| <b>Bityite</b><br>W. 273, LM. 1                | $\text{H}_{14}\text{Li}_4(\text{Ca}, \text{Be})_7\text{Al}_{16}\text{Si}_{11}\text{O}_{62}$       | Mc ?       | 3.05      | 1.63         |
| <b>Bixbyite</b><br>Dap. 1, ZK. 67              | $\text{FeMnO}_3$  | Is         | 5.00      | Op           |
| <b>Blende</b><br>D. 58, W. 19                  | (1) $\text{ZnS}$<br>(2) Group name incl. Alabandite and Pentlandite                               | Is<br>—    | 4.10<br>— | 2.37<br>—    |
| <b>Bloedite</b><br>D. 758, DL. 4 (2)           | $\text{Na}_2\text{Mg}(\text{SO}_4)_2 \cdot 4\text{H}_2\text{O}$                                   | Mc         | 2.23      | 1.489, 1.486 |
| <b>Blomstrandine</b><br>DL. 3 (1), Dap. 2      | $\text{YNbTi}_2\text{O}_8 + (0 \text{ to } \frac{1}{4})\text{Ti}_4\text{O}_8$                     | Or         | 4.9       | 2.14         |
| <b>Blomstrandite</b><br>D. 535B., DL. 3 (1)    | $\text{U}^4, \text{Ca}, \text{Fe}''', \text{Ti}, \text{Nb}, \text{O}, \text{H}_2\text{O}$         | Is ?       | 4.3       | ?            |
| <b>Blythite</b><br>MM. 21, AM. 13              | Hypothetical $\text{Mn}''_3\text{Mn}''''_2(\text{SiO}_4)_3$ in Garnet                             | Is         | —         | —            |
| <b>Bobierite</b><br>D. 599, W. 125             | $\text{Mg}_3(\text{PO}_4)_2 \cdot 8\text{H}_2\text{O}$  | Mc         | 2.40      | 1.543, 1.510 |
| <b>Bodenbenderite</b><br>MA. 3                 | $(\text{Mn}, \text{Ca})_4(\text{Al}, \text{Y})_2(\text{Si}, \text{Ti})_3\text{O}_{13}$            | Is         | 3.5       | 1.77         |
| <b>Boehmite</b><br>AM. 13, MA. 3               | $\text{Al}_2\text{O}(\text{OH})_2$ ? (doubtful species)   | Or         | ?         | ?            |
| <b>Boléite</b><br>W. 36, DL. 4 (3)             | $\text{Pb}_3\text{AgCu}_3(\text{OH})_6\text{Cl}_7$  | Is         | 5.10      | 2.05         |
| <b>Bolivarite</b><br>MA. 1, AM. 8              | $\text{Al}_2(\text{OH})_3\text{PO}_4 \cdot \text{H}_2\text{O}$                                    | ?          | 2.05      | ?            |
| <b>Boracite</b><br>H. 1 (4), AM. 13            | $\text{Mg}_3\text{ClB}_7\text{O}_{13}$  | Or         | 2.95      | 1.672, 1.662 |
| <b>Borax</b><br>D. 707, H. 1 (4)               | $\text{Na}_2\text{B}_4\text{O}_7 \cdot 10\text{H}_2\text{O}$                                      | Mc         | 1.70      | 1.472, 1.447 |
| <b>Borickite</b><br>D. 653, W. 154             | $3\text{CaO} \cdot 7\text{Fe}_2\text{O}_3 \cdot 2\text{P}_2\text{O}_5 \cdot 24\text{H}_2\text{O}$ | Am         | 2.70      | 1.6          |
| <b>Bornite</b><br>D. 78, DL. 4 (1)             | $\text{Cu}_5\text{FeS}_4$   | Is         | 5.05      | Op           |
| <b>Borocalcite</b><br>MT., USPP. 158           | = Bechilite   | —          | —         | —            |
| <b>Boromagnesite</b><br>MT., USPP. 158         | = Szaibelyite   | —          | —         | —            |
| <b>Boronatrocalcite</b><br>H. 1 (4), USPP. 158 | = Ulexite   | —          | —         | —            |
| <b>Botryogen</b><br>D. 798, DL. 4 (2)          | $\text{MgFe}''''(\text{OH})(\text{SO}_4)_2 \cdot 7\text{H}_2\text{O}$                             | Mc         | 2.10      | 1.572, 1.544 |
| <b>Boulangerite</b><br>D. 139, DL. 4 (1)       | $\text{Pb}_5\text{Sb}_4\text{S}_{11}$   | Or         | 6.20      | Op           |

A KEY TO MINERAL GROUPS, SPECIES AND VARIETIES 11

| <i>Name and Reference.</i>                 | <i>Composition.</i>   | <i>Cr.</i> | <i>G.</i> | <i>N.</i>    |
|--|---|------------|-----------|--------------|
| <b>Bournonite</b><br>D. 136, Dl. 4 (1)     | (1) $\text{CuPbSbS}_3$<br>(2) Group name incl. Aikinite and Seligmannite                                | Or         | 5.80      | Op           |
| <b>Boussingaultite</b><br>D. 759, W. 113   | $(\text{NH}_4)_2\text{Mg}(\text{SO}_4)_2 \cdot 6\text{H}_2\text{O}$                                     | Mc         | 1.70      | 1.479, 1.470 |
| <b>Bowenite</b><br>Dl. 2 (1)               | = Antigorite  | —          | —         | —            |
| <b>Bowlingite</b><br>W. 382, Dl. 2 (1)     | H, Mg, Fe, Al, Si, O. Probably = Saponite   | Mc         | 2.28      | 1.6          |
| <b>Brackebuschite</b><br>D. 566, Dl. 3 (1) | $\text{Pb}_2\text{Fe}''(\text{VO}_4)_2 \cdot \text{H}_2\text{O}$  | Mc         | ?         | 2.48, 2.28   |
| <b>Brandisite</b><br>W. 384, Dl. 2 (2)     | Optical var. of Seybertite  | Mc         | 3.10      | 1.660, 1.648 |
| <b>Brandtite</b><br>D. 591, Dl. 3 (1)      | $\text{Ca}_2\text{Mn}(\text{AsO}_4)_2 \cdot 2\text{H}_2\text{O}$  | Tc         | 3.65      | 1.724, 1.709 |
| <b>Brannerite</b><br>W. 70, MA. 1          | Ca, Y, U, Th, Ti, O, $\text{H}_2\text{O}$ . Perhaps = Delorenzite                                       | Tt ?       | 5.0       | 2.30         |
| <b>Braunite</b><br>D. 247, Dl. 3 (2)       | $3\text{Mn}_2\text{O}_3 \cdot \text{MnSiO}_3$   | Tt         | 4.80      | Op           |
| <b>Bravoite</b><br>AJS. 24, Dl. 4 (1)      | $\text{NiS}_2$  | Is         | 5.10      | Op           |
| <b>Breislakite</b><br>MT.                  | = Lievrite ?  | —          | —         | —            |
| <b>Breithauptite</b><br>D. 72, Dl. 4 (1)   | $\text{NiSb}$   | Hx         | 8.50      | Op           |
| <b>Breunnerite</b><br>W. 77, H. 1 (3)      | Ferrug. var. of Magnesite   | Hx         | 3.10      | 1.707, 1.517 |
| <b>Brewsterite</b><br>D. 439, W. 403       | $\text{Na}(\text{Sr}, \text{Ba})_5\text{Al}_{11}\text{Si}_{29}\text{O}_{80} \cdot 25\text{H}_2\text{O}$ | Mc         | 2.45      | 1.523, 1.510 |
| <b>Brochantite</b><br>D. 740, W. 104       | $\text{Cu}_4(\text{OH})_6\text{SO}_4$   | Or         | 3.90      | 1.803, 1.730 |
| <b>Broggerite</b><br>D. 711                | Thorium bearing var. of Uraninite *   | —          | —         | —            |
| <b>Brogniardtite</b><br>D. 132, Dl. 4 (1)  | $\text{Ag}_2\text{PbSb}_2\text{S}_5$  | ?          | 5.95      | Op           |
| <b>Bromellite</b><br>MA. 3, ZK. 62         | $\text{BeO}$  | Hx         | 3.00      | 1.733, 1.719 |
| <b>Bromlite</b><br>D. 278, W. 80           | $\text{BaCa}(\text{CO}_3)_2$  | Or         | 3.70      | 1.671, 1.526 |
| <b>Bromyrite</b><br>D. 171, H. 1 (2)       | $\text{AgBr}$   | Is         | 6.45      | 2.25         |
| <b>Bronzite</b><br>D. 323, Dl. 2 (1)       | = Hypersthene with sub-metallic lustre  | Or         | 3.35      | 1.705, 1.692 |
| <b>Brookite</b><br>D. 253, Dl. 3 (1)       | $\text{TiO}_2$  | Or         | 3.95      | 2.74, 2.58   |

\* So described, but all Uraninite is thorium bearing.

12 A KEY TO MINERAL GROUPS, SPECIES AND VARIETIES

| <i>Name and Reference.</i>                    | <i>Composition.</i>  | <i>Cr.</i> | <i>G.</i> | <i>N.</i>    |
|---|--|------------|-----------|--------------|
| <b>Brostenite</b><br>Dl. 3 (2), H. 1 (3)      | Mixture of Psilomelane and Limonite  | —          | —         | —            |
| <b>Brucite</b><br>D. 262, W. 42               | Mg(OH) <sub>2</sub>  | Hx         | 2.40      | 1.582, 1.562 |
| <b>Brugnatellite</b><br>W. 89, H. 1 (3)       | Mg, Fe <sup>'''</sup> , CO <sub>3</sub> , H <sub>2</sub> O. Close to Pyroaurite                                      | Hx         | 2.07      | 1.540, 1.510 |
| <b>Brushite</b><br>D. 618, W. 123             | HCaPO <sub>4</sub> · 2H <sub>2</sub> O   | Mc         | 2.20      | 1.551, 1.539 |
| <b>Bucholzite</b><br>W. 233, Dl. 2 (2)        | = Sillimanite  | —          | —         | —            |
| <b>Bunsenite</b><br>D. 227, Dl. 3 (2)         | NiO  | Is         | 6.80      | ?            |
| <b>Bustamite</b><br>W. 197, Dl. 2 (1)         | CaMn(SiO <sub>3</sub> ) <sub>2</sub>   | Tc         | 3.25      | 1.676, 1.662 |
| <b>Buszite</b><br>AM. 14, MA. 4               | Nd, Pr, Er, Si, O  | Hx         | 5.0       | 1.72         |
| <b>Buttgenbachite</b><br>MA. 3                | 2CuCl <sub>2</sub> · Cu(NO <sub>3</sub> ) <sub>2</sub> · 15Cu(OH) <sub>2</sub> · 4H <sub>2</sub> O                   | Hx         | 3.35      | 1.747, 1.745 |
| <b>Bytownite</b><br>D. 320, W. 338            | Sodium bearing var. of Anorthite, Ab <sub>3</sub> An <sub>7</sub> to Ab <sub>1</sub> An <sub>9</sub>                 | Tc         | 2.70      | 1.573, 1.564 |
| <b>Cabrerite</b><br>D. 603, W. 127            | Magnesian var. of Annabergite  | Mc.        | 2.95      | 1.689, 1.620 |
| <b>Cacoxenite</b><br>W. 141, Dl. 3 (1)        | Fe <sup>'''</sup> <sub>2</sub> (OH) <sub>3</sub> PO <sub>4</sub> · 4H <sub>2</sub> O                                 | Hx         | 2.80      | 1.646, 1.582 |
| <b>Caesarolite</b><br>Dl. 3 (2)               | = Wackenrodite   | —          | —         | —            |
| <b>Cahnite</b><br>AM. 12, MA. 3               | 4CaO · B <sub>2</sub> O <sub>3</sub> · As <sub>2</sub> O <sub>5</sub> · 4H <sub>2</sub> O                            | Tt         | 3.15      | 1.663, 1.662 |
| <b>Calamine</b><br>D. 423                     | = Hemimorphite *   | —          | —         | —            |
| <b>Calaverite</b><br>D. 105, Dl. 4 (1)        | AuTe <sub>2</sub>  | Mc ?       | 9.30      | Op           |
| <b>Calciclaste</b><br>W. 319                  | = Anorthite  | —          | —         | —            |
| <b>Calcioferrite</b><br>D. 652, Dl. 3 (1)     | Ca <sub>3</sub> Fe <sup>'''</sup> <sub>3</sub> (OH) <sub>3</sub> (PO <sub>4</sub> ) <sub>4</sub> · 8H <sub>2</sub> O | Mc         | 2.55      | 1.57         |
| <b>Calciosamaraskite</b><br>MA. 3, AM. 13     | Calcareous var. of Samaraskite   | Or         | 4.50      | ?            |
| <b>Calciovolborthite</b><br>Dl. 3 (1), W. 134 | CuCa(OH)VO <sub>4</sub>  | Mc         | 3.7       | 2.10, 2.01   |
| <b>Calcite</b><br>D. 270, H. 1 (3)            | (1) CaCO <sub>3</sub><br>(2) Group name incl. Dolomite, Magnesite, Rhodocrosite, Siderite, etc.                      | Hx         | 2.70      | 1.658, 1.486 |

\* With some authors = Smithsonite.

A KEY TO MINERAL GROUPS, SPECIES AND VARIETIES 13

| <i>Name and Reference.</i>              | <i>Composition.</i>                                  | <i>Cr.</i> | <i>G.</i> | <i>N.</i>    |
|---|--|------------|-----------|--------------|
| <b>Calderite</b><br>MA. 3, AM. 13       | $Mn^{++}Fe^{+++}_2(SiO_4)_2$                         | Is         | 4.35 *    | ?            |
| <b>Caledonite</b><br>D. 729, W. 119     | $5PbO \cdot 2CuO \cdot CO_2 \cdot 3SO_2 \cdot 3H_2O$ | Or         | 6.4       | 1.900, 1.818 |
| <b>Callainite</b><br>D. 612, DL. 3 (1)  | = Variscite  | —          | —         | —            |
| <b>Calomel</b><br>D. 164, H. 1 (2)      | HgCl   | Tx         | 6.50      | 2.656, 1.973 |
| <b>Campylite</b><br>D. 551, DL. 3 (1)   | Phosphatic var. of Mimetite                          | —          | —         | —            |
| <b>Camsellite</b><br>W. 93, AM. 13, 14  | = Szaibelyite ?                                      | —          | —         | —            |
| <b>Canbyite</b><br>W. 241, AM. 9        | $H_2Fe^{+++}_2Si_2O_8 \cdot 2H_2O$                   | Or ?       | 2.50      | 1.582, 1.562 |
| <b>Cancrinite</b><br>W. 271, DL. 2 (2)  | $3NaAlSiO_4 \cdot (Ca, NaH)CO_3 ?$                   | Hx         | 2.45      | 1.523, 1.495 |
| <b>Canfieldite</b><br>DL. 4 (1), DAp. 1 | $Ag_3SnS_4$  | Is         | 6.30      | Op           |
| <b>Cannizzarite</b><br>MA. 3, AM. 11    | $PbBi_2S_7$ = Chiviatite ?                           | Or         | 6.55      | Op           |
| <b>Caporcianite</b><br>W. 397           | Partly dehydrated Laumontite                         | —          | —         | —            |
| <b>Cappelinite</b><br>W. 248, DL. 2 (2) | $BaY_2B_2Si_2O_{24}$                                 | Hx         | 4.40      | 1.75         |
| <b>Caracolite</b><br>D. 729, DL. 4 (2)  | $2Pb(OH)Cl, Na_2SO_4 ?$                              | Or         | ?         | 1.764, 1.743 |
| <b>Carapatite</b><br>W. 129             | Probably mixture of Apatite and Calcite              | —          | —         | —            |
| <b>Carminite</b><br>DL. 3 (1), AM. 14   | $Pb_3Fe^{+++}_{10}(AsO_4)_{10}$                      | Or         | 4.10      | 1.8          |
| <b>Carnallite</b><br>D. 201, H. 1 (2)   | $KMgCl_2 \cdot 6H_2O$                                | Or         | 1.60      | 1.494, 1.466 |
| <b>Carnegieite</b><br>W. 270, DL. 2 (2) | $NaAlSiO_4$ (artificial)                             | Te         | 2.51      | 1.514, 1.509 |
| <b>Carnelian</b><br>D. 210, BPS.        | Red Chalcedony of gem quality                        | —          | —         | —            |
| <b>Carnotite</b><br>W. 14A, DL. 3 (1)   | $2K_2(UO_2)VO_4 \cdot 3H_2O$                         | Or         | 4.45      | 2.08, 2.06   |
| <b>Carpbolite</b><br>D. 424, W. 351     | $H_2Mn^{++}Al_2Si_2O_{10}$                           | Or         | 2.90      | 1.64, 1.62   |
| <b>Carphosiderite</b><br>D. 790, W. 108 | Mixture of Jarosite and Copiapite ? *                | —          | —         | —            |
| <b>Carrollite</b><br>D. 82, AM. 13      | = Mixt. of Liemacite and Chalcocite                  | —          | —         | —            |

\* Schaller (1911) thinks it may be a member of the alunite group with formula  $RF_2(OH)_2(SO_4)_2$



14 A KEY TO MINERAL GROUPS, SPECIES AND VARIETIES

| <i>Name and Reference.</i>                        | <i>Composition.</i>  | <i>Cr.</i> | <i>G.</i> | <i>N.</i>    |
|---|--|------------|-----------|--------------|
| <b>Caryinite</b><br>D. 540, W. 122                | $(\text{Ca, Mn, Pb})_3(\text{AsO}_4)_2$  | Or         | 4.25      | 1.805, 1.776 |
| <b>Caryocerite</b><br>D. 349, W. 248              | $6\text{CaSiO}_3 \cdot 2\text{CeBO}_3 \cdot 3\text{H}_2\text{ThO}_2\text{F}_2 \cdot 2\text{LaOF} ?$  | Hx         | 4.30      | 1.74         |
| <b>Caryopilite</b><br>D. 508, W. 227              | = Bementite  | —          | —         | —            |
| <b>Cassiterite</b><br>D. 248, H. 1 (2)            | $\text{SnO}_2$   | Tt         | 6.90      | 2.093, 1.997 |
| <b>Castanite</b><br>D. 783, Ls.                   | = Quetenite  | —          | —         | —            |
| <b>Caswellite</b><br>Dl. 2 (2), MT                | Alteration product of Biotite  | ?          | 3.54      | ?            |
| <b>Catapleiite</b><br>D. 346, W. 163              | $\text{H}_4\text{Na}_2\text{ZrSi}_3\text{O}_{11}$  | Mc         | 2.75      | 1.627, 1.591 |
| <b>Cebollite</b><br>W. 349, Dl. 2 (2)             | $5\text{CaO} \cdot \text{Al}_2\text{O}_3 \cdot 3\text{SiO}_2 \cdot 2\text{H}_2\text{O}$  | Or         | 2.95      | 1.628, 1.595 |
| <b>Celadonite</b><br>D. 489, W. 372               | = Glaucconite  | —          | —         | —            |
| <b>Celestite (Celestine)</b><br>D. 720, Dl. 4 (2) | $\text{SrSO}_4$  | Or         | 3.95      | 1.631, 1.622 |
| <b>Celsian</b><br>W. 319, Dl. 2 (3)               | $\text{BaAl}_2(\text{SiO}_4)_2$  | Mc         | 3.40      | 1.594, 1.583 |
| <b>Cenosite</b><br>D. 501, AM. 15                 | $2\text{CaO} \cdot \text{Y}_2\text{O}_3 \cdot \text{CO}_2 \cdot 4\text{SiO}_2 \cdot \text{H}_2\text{O}$  | Or         | 3.40      | 1.687, 1.666 |
| <b>Centrallassite</b><br>W. 227, MA. 3            | $4\text{CaO} \cdot 7\text{SiO}_2 \cdot 5\text{H}_2\text{O}$  | Or         | 2.50      | 1.549, 1.535 |
| <b>Cerargyrite</b><br>D. 169, H. 1 (2)            | $\text{AgCl}$  | Is         | 5.55      | 2.06         |
| <b>Cerfluorite</b><br>W. 35, DAp. 3               | Cerium bearing var. of Fluorite  | —          | —         | —            |
| <b>Cergadolinite</b><br>AM. 12, Dl. 2 (2)         | Cerium bearing var. of Gadolinite  | Mc         | 4.65      | ?            |
| <b>Cerite</b><br>W. 251, DL 2 (2)                 | $\text{H}_3(\text{Ca, Fe})\text{Ce}_3\text{Si}_3\text{O}_{13}$   | Or         | 4.90      | 1.821, 1.817 |
| <b>Ceruleolactite</b><br>W. 141, Dl. 3 (1)        | $2\text{Al}_3(\text{OH})_3(\text{PO}_4)_2 \cdot 7\text{H}_2\text{O}$   | Mc         | 2.69      | 1.588, 1.580 |
| <b>Cerussite</b><br>D. 281, H. 1 (3)              | $\text{PbCO}_3$  | Or         | 6.55      | 2.078, 1.803 |
| <b>Cervantite</b><br>D. 221, W. 69                | $\text{Sb}_2\text{O}_4$  | Or         | 4.0       | 2.0 ±        |
| <b>Ceylonite</b><br>D. 234, H. 1 (4)              | Ferrug. var. of Spinel   | Is         | 3.8       | 1.77         |
| <b>Chabazite</b><br>Dl. 2 (3), W. 391             | $\text{Ca}_7\text{Al}_{14}\text{Si}_{26}\text{O}_{80} \cdot 40\text{H}_2\text{O} + \text{Na}_4\text{Ca}_3\text{Al}_{10}\text{Si}_{30}\text{O}_{80} \cdot 40\text{H}_2\text{O}$ | Hx ?       | 2.10      | 1.485, 1.481 |
| <b>Chalcanthite</b><br>D. 755, Dl. 4 (2)          | $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$  | Tc         | 2.28      | 1.543, 1.514 |
| <b>Chalcedonite</b><br>W. 59                      | Microcrystalline form of Quartz  | —          | —         | —            |

| <i>Name and Reference.</i>                   | <i>Composition.</i>   | <i>Cr.</i> | <i>G.</i>         | <i>N.</i> |
|--|---|------------|-------------------|-----------|
| <b>Chalcedony</b><br>D. 210                  | = Chalcedonite or a mixture of Chalcedonite and Opal  | —          | —                 | —         |
| <b>Chalcocite A and B</b><br>D. 54, DL 4 (1) | (A) $\text{Cu}_2\text{S}$<br>(B) $\text{Cu}_2\text{S}$  | Is<br>Or   | ?<br>5.75         | Op<br>Op  |
| <b>Chalcodite</b><br>W. 371, DL 2 (3)        | = Stilpnomelane   | Mc         | ? 1.77, 1.64      |           |
| <b>Chalcoalumite</b><br>W. 116, DL 4 (2)     | $\text{CuO} \cdot \text{Al}_2\text{O}_3 \cdot \text{SO}_3 \cdot 9\text{H}_2\text{O}$            | Tc         | 2.30 1.532, 1.523 |           |
| <b>Chalcolamprite</b><br>W. 159, DAp. 2      | $\text{Na}_4\text{Ca}_2(\text{F}, \text{OH})_6\text{Nb}_6(\text{Si}, \text{Zr})_3\text{O}_{22}$ | Is         | 3.75 1.87         |           |
| <b>Chalcomenite</b><br>D. 811, H. 1 (3)      | $\text{CuSeO}_3 \cdot 2\text{H}_2\text{O}$  | Mc         | 3.75 1.732, 1.710 |           |
| <b>Chalcophanite</b><br>D. 268, H. 1 (2)     | $(\text{Mn}, \text{Zn})\text{O} \cdot 2\text{MnO}_2 \cdot 2\text{H}_2\text{O}$                  | Hx         | 3.90 —, 2.72      |           |
| <b>Chalcophyllite</b><br>D. 636, DL 3 (1)    | $8\text{CuO} \cdot \text{As}_2\text{O}_5 \cdot 24\text{H}_2\text{O} ?$                          | Hx         | 2.55 1.632, 1.575 |           |
| <b>Chalcopyrite</b><br>D. 83, DL 4 (1)       | $\text{CuFeS}_2$  | Tt         | 4.15 Op           |           |
| <b>Chalcosiderite</b><br>D. 656, W. 153      | $\text{CuFe}''_6(\text{OH})_8(\text{PO}_4)_4 \cdot 5\text{H}_2\text{O}$                         | Tc         | 3.10 1.845, 1.773 |           |
| <b>Chalcostibite</b><br>D. 117, DL 4 (1)     | $\text{CuSbS}_2$  | Or         | 5.00 Op           |           |
| <b>Chalcotrichite</b><br>D. 224, H. 1 (2)    | Acicular form of Cuprite  | —          | —                 | —         |
| <b>Chalmersite</b><br>DL 4 (1), MA. 2        | = Cubanite  | —          | —                 | —         |
| <b>Chalybite</b><br>D. 273, H. 1 (3)         | = Siderite  | —          | —                 | —         |
| <b>Chamosite</b><br>LF. 1, DL 2 (3)          | Doubtful species of Chlorite Group  | Mc         | ? ?               |           |
| <b>Chapmanite</b><br>W. 406, MA. 2           | $5\text{FeO} \cdot \text{Sb}_2\text{O}_5 \cdot 5\text{SiO}_2 \cdot 2\text{H}_2\text{O}$         | Or         | 3.60 1.96, 1.85   |           |
| <b>Chenevixite</b><br>D. 655, DL 3 (1)       | $\text{Cu}_2\text{Fe}''_3(\text{OH})_4(\text{AsO}_4)_2 \cdot \text{H}_2\text{O}$                | ?          | 3.9 1.88          |           |
| <b>Chevkinite</b><br>W. 252                  | = Tscheffkinite   | —          | —                 | —         |
| <b>Chiastolite</b><br>D. 398, LF. 1          | Andalusite with cruciform inclusions  | —          | —                 | —         |
| <b>Childrenite</b><br>D. 649, W. 152         | $\text{Fe}''\text{Al}(\text{OH})_2\text{PO}_4 \cdot \text{H}_2\text{O}$                         | Or         | 3.25 1.684, 1.643 |           |
| <b>Chilenite</b><br>DL 4 (1), D. 40          | $\text{Ag}_{12}\text{Bi}$   | ?          | ? Op              |           |
| <b>Chillagite</b><br>DL 4 (2)                | Tungstiferous var. of Wulfenite   | Tt         | 7.5 ?             |           |
| <b>Chili-loeweite</b><br>MA. 3, AM. 14       | $\text{K}_2\text{Na}_4\text{Mg}_2(\text{SO}_4)_5 \cdot 5\text{H}_2\text{O}$                     | Hx         | 2.15 1.470, 1.434 |           |
| <b>Chinkolobvite</b><br>BSF. 49, DL 4 (2)    | = Sklodovskite  | —          | —                 | —         |

| <i>Name and Reference.</i>                       | <i>Composition.</i>   | <i>Cr.</i> | <i>G.</i> | <i>N.</i>    |
|--|---|------------|-----------|--------------|
| <b>Chiolite</b><br>D. 184, H. 1 (2)              | $\text{Na}_5\text{Al}_3\text{F}_{11}$   | Tt         | 2.99      | 1.349, 1.342 |
| <b>Chiviatite</b><br>D. 111, Dl. 4 (1)           | $\text{Pb}_2\text{Bi}_6\text{S}_{11}$   | Mc ?       | 6.90      | Op.          |
| <b>Chloanthite</b><br>D. 88, Dl. 4 (1)           | $\text{NiAs}_2$   | Is         | 6.75      | Op           |
| <b>Chloraluminite</b><br>W. 32, H. 1 (2)         | $\text{AlCl}_3 \cdot 6\text{H}_2\text{O}$   | Hx         | ?         | 1.63, 1.58   |
| <b>Chlorapatite</b><br>D. 549B., Dl. 3 (1)       | $\text{Ca}_5\text{Cl}(\text{PO}_4)_3$   | Hx         | 3.20      | 1.660, 1.656 |
| <b>Chlorargyrite</b><br>W. 30                    | = Cerargyrite   | —          | —         | —            |
| <b>Chlorastrolite</b><br>W. 394                  | Optical var. of Thomsonite  | —          | —         | —            |
| <b>Chlorite</b><br>W. 373, Dl. 2 (3)             | Group name incl. Antigorite, Amesite, Penninite, etc.   | —          | —         | —            |
| <b>Chloritoid</b><br>D. 466, W. 385              | $\text{H}_2\text{Fe}''\text{Al}_2\text{SiO}_7$  | Tr ?       | 3.55      | 1.731, 1.720 |
| <b>Chlormanganokalite</b><br>W. 33, Dl. 4 (2)    | $\text{K}_4\text{MnCl}_6$   | Hx         | 2.31      | 1.59         |
| <b>Chlormankalite</b><br>W. 33                   | = Chlormanganokalite  | —          | —         | —            |
| <b>Chlorocalcite</b><br>W 33, Dl. 4 (2)          | $\text{KCaCl}_3$  | Or ?       | ?         | 1.52         |
| <b>Chloromagnesite</b><br>D. 176, H. 1 (2)       | $\text{MgCl}_2$   | Hx         | ?         | 1.67, 1.59   |
| <b>Chloromelanite</b><br>W. 193, Dl. 2 (1)       | Ferriferous var. of Jadeite   | —          | —         | —            |
| <b>Chloronatrokalkite</b><br>H. 1 (2), Dl. 4 (2) | Sodium-bearing var. of Sylvine  | —          | —         | —            |
| <b>Chloropal</b><br>D. 505, MT.                  | Mixture of Opal and Nontronite  | —          | —         | —            |
| <b>Chlorophaeite</b><br>MM. 20, Dl. 2 (3)        | $(\text{Fe}, \text{Mg})_4(\text{Fe}, \text{Al})_4\text{Si}_7\text{O}_{24} \cdot 16\text{H}_2\text{O}$   | Am.        | 2.0       | 1.498        |
| <b>Chlorophoenicite</b><br>W. 133, MA. 2         | $(\text{Mn}, \text{Zn})_5(\text{OH})_7\text{AsO}_4$   | Mc         | 3.55      | 1.697, 1.682 |
| <b>Chlorophyllite</b><br>W. 275, MT.             | Mixture of Chlorite, etc.   | —          | —         | —            |
| <b>Chlorospinel</b><br>W. 63, MT.                | = Spinel  | —          | —         | —            |
| <b>Chlorothionite</b><br>Dl. 4 (2), MT.          | $\text{K}_2\text{SO}_4 \cdot \text{CuCl}_2$   | ?          | ?         | ?            |
| <b>Chloroxiphite</b><br>W. 38, Dl. 4 (3)         | $\text{Pb}_3\text{CuO}_2(\text{OH})_2\text{Cl}_2$   | Mc         | 6.75      | ?            |
| <b>Chondrarsenite</b><br>D. 572, Dl. 3 (1)       | = Impure Sarkinite  | —          | —         | —            |
| <b>Chondrodite</b><br>D. 415, PRS. 1927          | (1) $\text{Mg}_5(\text{F}, \text{OH})_3(\text{SiO}_4)_2$<br>(2) Group name incl. Clinohumite and Humite | Mc         | 3.15      | 1.64, 1.61   |

A KEY TO MINERAL GROUPS, SPECIES AND VARIETIES 17

| <i>Name and Reference.</i>                 | <i>Composition.</i>  | <i>Cr.</i> | <i>G.</i> | <i>N.</i>    |
|--|--|------------|-----------|--------------|
| <b>Christophite</b><br>DL. 4 (1), H. 1 (1) | Ferruginous var. of Blende   | Is.        | 3.95      | 2.45         |
| <b>Chromepidote</b><br>AM. 12, MT.         | = Tawmawite  | —          | —         | —            |
| <b>Chromhercynite</b><br>D. 235, DL. 4 (2) | Chromiferous var. of Hercynite   | Is         | —         | —            |
| <b>Chromite</b><br>D. 241, DL. 4 (2)       | FeCr <sub>2</sub> O <sub>4</sub>   | Is         | 5.0*      | 2.1          |
| <b>Chromochre</b><br>W. 364                | = Fuchsite or Miloschite   | —          | —         | —            |
| <b>Chrompicotite</b><br>D. 241, DL. 4 (2)  | Ferruginous var. of Picrochromite  | Is         | —         | —            |
| <b>Chromrutile</b><br>AM. 13, MM. 21       | Chromiferous var. of Rutile  | Tt         | ?         | ?            |
| <b>Chrysoberyl</b><br>D. 242, H. 1 (4)     | BeAl <sub>2</sub> O <sub>4</sub>   | Or         | 3.75      | 1.755, 1.746 |
| <b>Chrysocolla</b><br>D. 504, W. 231       | CuSiO <sub>2</sub> · 2H <sub>2</sub> O   | Or ?       | 2.4       | 1.5          |
| <b>Chrysolite</b><br>D. 376, W. 166        | Ferruginous var. of Forsterite   | Or         | 3.3       | 1.680, 1.645 |
| <b>Chrysoprase</b><br>D. 210, BPS.         | Green Chalcedony of gem quality  | —          | —         | —            |
| <b>Chrysotile</b><br>W. 228, DL. 2 (1)     | H <sub>4</sub> Mg <sub>3</sub> Si <sub>2</sub> O <sub>9</sub>                                | Mc         | 2.40      | 1.555, 1.542 |
| <b>Churchite</b><br>D. 606, DL. 3 (1)      | 2CaO · 3Ce <sub>2</sub> O <sub>3</sub> · 4P <sub>2</sub> O <sub>5</sub> · 17H <sub>2</sub> O | Or ?       | 3.15      | 1.654, 1.620 |
| <b>Cimolite</b> •<br>D. 495, AM. 10        | Al <sub>2</sub> O <sub>3</sub> · 4SiO <sub>2</sub> · 3H <sub>2</sub> O                       | Am         | ?         | ?            |
| <b>Cinnabar</b><br>D. 66, DL. 4 (1)        | HgS  | Hx         | 8.15      | 3.21, 2.88   |
| <b>Cirrolite</b><br>D. 576                 | 6CaO · 2Al <sub>2</sub> O <sub>3</sub> · 3P <sub>2</sub> O <sub>5</sub> · 3H <sub>2</sub> O  | ?          | 3.10      | ?            |
| <b>Citrine</b><br>BPS.                     | Yellow Quartz of gem quality   | —          | —         | —            |
| <b>Claudetite</b><br>D. 215, W. 45         | As <sub>2</sub> O <sub>3</sub>   | Mc         | 3.95      | 2.01, 1.87   |
| <b>Clausthalite</b><br>D. 4, DL. 4 (1)     | PbSe   | Is         | 8.15      | Op           |
| <b>Cleavelandite</b><br>DL. 2 (2), D. 316  | = Albite   | —          | —         | —            |
| <b>Cleveite</b><br>D. 711, DL. 4 (2)       | Yttrium-bearing var. of Uraninite  | Is         | 7.5       | ?            |
| <b>Clinochlore</b><br>W. 376, D. 468       | Cocrystallisation in equal proportions of Antigorite and Amesite                             | Mc         | 2.70      | 1.58         |
| <b>Clinoclasite</b><br>W. 133, DL. 3 (1)   | Cu <sub>3</sub> (OH) <sub>3</sub> AsO <sub>4</sub>   | Mc         | 4.35      | 1.91, 1.73   |

\* Lower when much MgCr<sub>2</sub>O<sub>4</sub> is present.

18 A KEY TO MINERAL GROUPS, SPECIES AND VARIETIES

| <i>Name and Reference.</i>                   | <i>Composition.</i>   | <i>Cr.</i> | <i>G.</i>          | <i>N.</i>    |
|--|---|------------|--------------------|--------------|
| <b>Clinoenstatite</b><br>W. 179, Dl. 2 (1)   | $Mg_2(SiO_3)_2$   | Mc         | 3.20               | 1.660, 1.651 |
| <b>Clinohedrite</b><br>W. 226, Dl. 2 (1)     | $CaZn(OH)_2SiO_3$   | Mc         | 3.35               | 1.675, 1.665 |
| <b>Clinohumite</b><br>W. 224, Dl. 2 (1)      | $Mg_9(F, OH)_2(SiO_4)_4$  | Mc         | 3.10               | 1.690, 1.658 |
| <b>Clinohypersthene</b><br>W. 180, Dl. 2 (1) | Ferruginous var. of Clinoenstatite  | Mc         | 3.35               | 1.730, 1.713 |
| <b>Clinozoisite</b><br>W. 354, Dl. 2 (2)     | $HCa_2Al_3Si_3O_{13}$   | Mc         | 3.35               | 1.735, 1.725 |
| <b>Clintonite</b><br>D. 465, W. 383          | (1) = Seybertite<br>(2) Group name incl. Chloritoid, Ephesite, Kossmatite, and Margarite. | Mc         | —                  | —            |
| <b>Cobaltite</b><br>D. 89, Dl. 4 (1)         | $CoAsS$   | Is         | 6.20               | Op           |
| <b>Cobaltomenite</b><br>Dl. 4 (1)            | $CoSeO_4 \cdot 2H_2O ?$   | Mc         | ?                  | ?            |
| <b>Coccinite</b><br>H. 1 (2), Dl. 4 (3)      | $HgI_2$   | Tt         | 6.30               | ?            |
| <b>Codazzite</b><br>MM. 21, AM. 13           | Cerium bearing var. of Calcite*   | Hx         | —                  | —            |
| <b>Cohenite</b><br>D. 25, H. 1 (1)           | $Fe_3C$ or $(Fe, Ni)_3C$  | Is or Hx   | 7.25               | Op           |
| <b>Colemanite</b><br>D. 704, H. 1 (4)        | $Ca_2B_6O_{11} \cdot 5H_2O$   | Mc         | 2.40               | 1.614, 1.586 |
| <b>Collbranite</b><br>AM. 6, MA. 1           | = Ludwigite   | —          | —                  | —            |
| <b>Collinsite</b><br>MA. 3, AM. 13           | $2Ca_2(Mg, Fe)(PO_4)_2 \cdot 5H_2O$   | Tc         | 2.95               | 1.657, 1.632 |
| <b>Collophanite</b><br>Dl. 3 (1), AM. 13     | $Ca_3(PO_4)_2 \cdot H_2O$   | Am         | 2.7                | 1.60         |
| <b>Collyrite</b><br>D. 499, W. 240           | $3Al_2O_3 \cdot 2SiO_2 \cdot 12H_2O$<br>Doubtful species                                  | Am         | ?                  | 1.555        |
| <b>Coloradoite</b><br>D. 62, Dl. 4 (1)       | $HgTe$  | Is         | 8.05               | Op           |
| <b>Columbite</b><br>D. 525, Dl. 3 (1)        | (1) $FeNb_2O_6$<br>(2) Group name incl. Manganocolumbite, Manganotantalite and Tantalite  | Or         | 5.20<br>to<br>6.55 | 2.4, AO      |
| <b>Comuccite</b><br>MM. 21, DL. 4 (1)        | $5(Pb, Fe)S \cdot 3Sb_2S_3$ . Possibly = Jamesonite                                       | ?          | 5.65               | Op           |
| <b>Conichalcite</b><br>Dl. 3 (1), W. 134     | $2CuCa(OH)AsO_4 \cdot H_2O$   | Or         | 4.15               | 1.795, 1.771 |

\* Probably a mixture of Calcite and Parisite, AM. 13, 570.

A KEY TO MINERAL GROUPS, SPECIES AND VARIETIES 19

| <i>Name and Reference.</i>               | <i>Composition.</i>   | <i>Cr.</i>     | <i>G.</i> | <i>N.</i>    |
|--|---|----------------|-----------|--------------|
| <b>Connarite</b><br>D. 486, W. 377       | $2\text{NiO} \cdot 3\text{SiO}_2 \cdot 2\text{H}_2\text{O}$                                   | Hx ?           | 2.5       | 1.59, 1.56   |
| <b>Connellite</b><br>D. 731, Dl. 4 (2)   | $2\text{CuCl}_2 \cdot \text{CuSO}_4 \cdot 16\text{Cu}(\text{OH})_2 \cdot 3\text{H}_2\text{O}$ | Hx             | 3.35      | 1.747, 1.735 |
| <b>Cookeite</b><br>W. 372, Dl. 2 (2)     | $\text{H}_6\text{LiAl}_3\text{Si}_2\text{O}_{12}$   | Mc             | 2.67      | 1.597, 1.576 |
| <b>Cooperite</b><br>AM. 14, MA. 4        | $\text{Pt}(\text{S}, \text{As})_2$  | Is             | 9.0       | Op           |
| <b>Copiapite</b><br>D. 784, Dl. 4 (2)    | $\text{Fe}'''\text{Fe}''_4(\text{OH})_2(\text{SO}_4)_5 \cdot 16\text{H}_2\text{O}$            | Or<br>or<br>Mc | 2.10      | 1.58, 1.52   |
| <b>Copper</b><br>D. 15, Dl. 3 (2)        | Cu  | Is             | 8.85      | Op           |
| <b>Coquimbite</b><br>D. 772, Dl. 4 (2)   | $\text{Fe}'''\text{Fe}''_2(\text{SO}_4)_3 \cdot 9\text{H}_2\text{O}$                          | Hx             | 2.10      | 1.557, 1.552 |
| <b>Cordierite</b><br>D. 353, W. 273      | $\text{Mg}_2\text{Al}_4\text{Si}_5\text{O}_{18}$  | Or             | 2.62      | 1.545, 1.538 |
| <b>Cordylite</b><br>W. 87, H. 1 (3)      | $\text{BaF}_2 \cdot (\text{Ce}, \text{La})_2(\text{CO}_3)_3$                                  | Hx             | 4.30      | 1.764, 1.577 |
| <b>Corkite</b><br>W. 119, Dl. 3 (1)      | $\text{PbSO}_4 \cdot \text{FePO}_4 \cdot 2\text{Fe}(\text{OH})_3$                             | Hx             | 4.20      | 1.93, 1.925  |
| <b>Cornetite</b><br>W. 131, MM. 19       | $\text{Cu}_3(\text{OH})_3\text{PO}_4$   | Or             | 4.10      | 1.835, 1.765 |
| <b>Cornuile</b><br>W. 232, MM. 18        | $m\text{CuO} \cdot n\text{SiO}_2 \cdot \text{H}_2\text{O}$                                    | Am             | 2.0       | 1.54         |
| <b>Cornwallite</b><br>D. 634, W. 135     | $\text{Cu}_5(\text{OH})_4(\text{AsO}_4)_2 \cdot \text{H}_2\text{O}$                           | Or ?           | 4.15      | 1.85, 1.81   |
| <b>Coronadite</b><br>H. 1 (3), Dl. 3 (2) | = Wackenrodite  | —              | —         | —            |
| <b>Corundophilite</b><br>W. 376, D. 470  | Magnesian var. of Amesite   | —              | —         | —            |
| <b>Corundum</b><br>D. 231, H. 1 (2)      | $\text{Al}_2\text{O}_3$   | Hx             | 4.05      | 1.769, 1.761 |
| <b>Corynite</b><br>D. 91, Dl. 4 (1)      | Mixture of Gersdorffite and Ullmannite  | —              | —         | —            |
| <b>Cosalite</b><br>D. 128, Dl. 4 (1)     | $\text{PbBiS}_2$  | Or             | 6.75      | Op           |
| <b>Cossyrite</b><br>W. 217, Dl. 2 (1)    | = Aenigmatite   | —              | —         | —            |
| <b>Cotunnite</b><br>D. 180, H. 1 (2)     | $\text{PbCl}_2$   | Or             | 5.85      | 2.260, 2.200 |
| <b>Covellite</b><br>D. 67, Dl. 4 (1)     | CuS   | Hx             | 4.65      | Op           |
| <b>Crandallite</b><br>W. 150, MA. 1      | $\text{CaAl}_4(\text{OH})_8(\text{PO}_4)_2 \cdot \text{H}_2\text{O}$                          | Or             | ?         | 1.595, 1.585 |
| <b>Crednerite</b><br>D. 245, MM. 20      | $\text{CuMn}_2\text{O}_4$   | Mc             | 5.00      | Op           |

## 20 A KEY TO MINERAL GROUPS, SPECIES AND VARIETIES

| <i>Name and Reference.</i>                     | <i>Composition.</i>  | <i>Cr.</i> | <i>G.</i>  | <i>N.</i>       |
|--|--|------------|------------|-----------------|
| <b>Creedite</b><br>W. 120, Dl. 4 (2)           | $\text{CaSO}_4 \cdot \text{CaF}_2 \cdot 2\text{Al}(\text{F}, \text{OH})_3 \cdot 2\text{H}_2\text{O}$ | Mc         | 2.70       | 1.485, 1.461    |
| <b>Crestmorite</b><br>W. 227, MM. 20           | $2\text{CaSiO}_3 \cdot 3\text{H}_2\text{O}$ or $\text{CaSiO}_3 \cdot \text{H}_2\text{O}$             | Mc         | 2.22       | 1.607, 1.593    |
| <b>Crichtonite</b><br>D. 233, Dl. 3 (1)        | = Ilmenite   | —          | —          | —               |
| <b>Cristobalite</b><br>W. 55, H. 1 (2)         | $\text{SiO}_2$   | Tt         | 2.25       | 1.487, 1.484    |
| <b>Crocidolite</b><br>D. 340, W. 208           | Fibrous form of Riebeckite   | Mc         | —          | —               |
| <b>Crocoite</b><br>D. 725, Dl. 4 (2)           | $\text{PbCrO}_4$   | Mc         | 6.0        | 2.66, 2.30      |
| <b>Cronstedtite</b><br>D. 472, W. 381          | $\text{H}_4\text{Fe}''_2\text{Fe}'''_2\text{SiO}_9$  | Mc         | 3.45       | 1.80            |
| <b>Crookesite</b><br>D. 53, Dl. 4 (1)          | $(\text{Cu}, \text{Tl}, \text{Ag})_2\text{Se}$   | Is         | 6.90       | Op              |
| <b>Crossite</b><br>W. 208, Dl. 2 (1)           | Aluminous var. of Riebeckite   | Mc         | —          | —               |
| <b>Cryolithionite</b><br>W. 33, H. 1 (2)       | $\text{Li}_3\text{Na}_3\text{Al}_2\text{F}_{12}$   | Is         | 2.78       | 1.340           |
| <b>Cryolite</b><br>D. 183, H. 1 (2)            | $\text{Na}_3\text{AlF}_6$  | Mc         | 3.00       | 1.340, 1.339    |
| <b>Cryophyllite</b><br>W. 364, Dl. 2 (2)       | Ferriferous var. of Lepidolite   | Mc         | —          | —               |
| <b>Cryptohalite</b><br>D. 185D., Dl. 4 (3)     | $(\text{NH}_4)_2\text{SiF}_6$  | Is         | 2.01       | 1.370           |
| <b>Cubanite</b><br>D. 81, AM. 8                | $\text{CuFe}_2\text{S}_3$  | Is         | 4.05       | Op              |
| <b>Cumengéite</b><br>W. 36, Dl. 4 (3)          | $2\text{PbCu}(\text{OH})_2\text{Cl}_2 \cdot \text{H}_2\text{O}$                                      | Tt         | 4.70       | 2.03, 1.95      |
| <b>Cumingtonite</b><br>D. 338, W. 206          | $\text{H}_2\text{Mg}_3\text{Fe}''_4(\text{SiO}_3)_8$ *   | Mc         | 3.20       | 1.67, 1.64      |
| <b>Cuprite</b><br>D. 224, W. 40                | $\text{Cu}_2\text{O}$  | Is         | 6.00       | 2.849           |
| <b>Cuprobismutite</b><br>D. 112, Dl. 4 (1)     | = Emplectite   | —          | —          | —               |
| <b>Cuprodescloizite</b><br>D. 564B., Dl. 3 (1) | (1) $\text{PbCu}(\text{OH})\text{VO}_4$ †<br>(2) Cupriferous var. of Descloizite                     | Or<br>Or   | 6.0<br>6.0 | 2.32, 2.17<br>? |
| <b>Cuproiodargyrite</b><br>Dl. 4 (3), H. 1 (2) | $\text{CuAgI}_2$   | Is         | ?          | ?               |
| <b>Cuproscheelite</b><br>D. 815B., Dl. 4 (2)   | Cupriferous var. of Scheelite  | Tt         | —          | —               |
| <b>Cuprotungstite</b><br>D. 815, Dl. 4 (2)     | $\text{CuWO}_4$  | Tt         | ?          | 2.15            |

\* Probably co-crystallisation of Kupfferite and Grunerite.  
† Doelter Analysis 20 from Bisbee, Arizona, cf. Mottramite.

A KEY TO MINERAL GROUPS, SPECIES AND VARIETIES 21

| <i>Name and Reference.</i>                | <i>Composition.</i>   | <i>Cr.</i> | <i>G.</i> | <i>N.</i>    |
|---|---|------------|-----------|--------------|
| <b>Cuprozinkite</b><br>W. 85, H. 1 (3)    | Zinkiferous var. of Malachite   | Mc         | 4.10      | —            |
| <b>Curite</b><br>MA. 3, DL. 4 (2)         | 2PbO . 5UO <sub>3</sub> . 4H <sub>2</sub> O   | Or         | 7.20      | 2.07         |
| <b>Cuspidine</b><br>W. 225, DL. 2 (1)     | Ca <sub>2</sub> F <sub>2</sub> SiO <sub>3</sub>   | Mc         | 2.95      | 1.602, 1.590 |
| <b>Custerite</b><br>W. 225, DAp. 3        | Hydroxyl-bearing var. of Cuspidine Ca <sub>2</sub> (F, OH) <sub>2</sub> SiO <sub>3</sub>            | Mc         | 2.90      | 1.598, 1.586 |
| <b>Cyanite</b><br>D. 400, DL. 2 (2)       | = Kyanite   | —          | —         | —            |
| <b>Cyanochroite</b><br>D. 761, DL. 4 (2)  | K <sub>2</sub> Cu(SO <sub>4</sub> ) <sub>2</sub> . 6H <sub>2</sub> O                                | Mc         | 2.22      | 1.502, 1.484 |
| <b>Cyanotrichite</b><br>D. 781, DL. 4 (2) | 4CuO . Al <sub>2</sub> O <sub>3</sub> . SO <sub>3</sub> . 8H <sub>2</sub> O =<br>Lettsomite (DL.)   | Or         | 2.75      | 1.655, 1.588 |
| <b>Cylindrite</b><br>DAp. 1, DL. 4 (1)    | 6PbS. 6SnS <sub>2</sub> . Sb <sub>2</sub> S <sub>3</sub>  | ?          | 5.40      | Op           |
| <b>Cyprusite</b><br>D. 795, DL. 4 (2)     | Mixture of Jarosite and Alunite   | —          | —         | —            |
| <b>Cyrtolite</b><br>D. 394A., W. 51       | ZrSiO <sub>4</sub> . 2H <sub>2</sub> O  | ?          | 4.1       | 1.830, 1.825 |
| <b>Dachiardite</b><br>AM. 10, MA. 3       | K <sub>2</sub> O . 2CaO . 2Al <sub>2</sub> O <sub>3</sub> . 18SiO <sub>2</sub> . 14H <sub>2</sub> O | Mc         | 2.15      | 1.500, 1.492 |
| <b>Dahllite</b><br>W. 156, DL. 3 (1)      | 4Ca <sub>3</sub> (PO <sub>4</sub> ) <sub>2</sub> . 2CaCO <sub>3</sub> . H <sub>2</sub> O            | Hx         | 2.95      | 1.62, 1.61   |
| <b>Damourite</b><br>D. 458, H. 2          | H <sub>2</sub> (K, H)Al <sub>3</sub> (SiO <sub>4</sub> ) <sub>3</sub><br>Possibly = Muscovite       | Mc         | 2.80      | ?            |
| <b>Danaite</b><br>D. 98, DL. 4 (1)        | Cobaltiferous var. of Arsenopyrite,<br>or superferrug. var. of Glaucodot                            | Or         | 6.3       | Op           |
| <b>Danalite</b><br>D. 367, W. 220         | (Fe, Zn) <sub>4</sub> Be <sub>3</sub> S(SiO <sub>4</sub> ) <sub>2</sub>                             | Is         | 3.45      | 1.737        |
| <b>Danburite</b><br>D. 396, DL. 2 (2)     | CaB <sub>2</sub> (SiO <sub>4</sub> ) <sub>2</sub>   | Or         | 3.00      | 1.636, 1.631 |
| <b>Dannemorite</b><br>D. 338, W. 206      | Manganiferous var. of Cummingtonite   | Mc         | —         | —            |
| <b>Daphnite</b><br>D. 471, W. 376         | H <sub>4</sub> Fe'' <sub>2</sub> Al <sub>2</sub> SiO <sub>9</sub>                                   | Mc         | 3.00      | 1.65         |
| <b>Darapskite</b><br>D. 689, H. 1 (3)     | Na <sub>2</sub> SO <sub>4</sub> . NaNO <sub>3</sub> . H <sub>2</sub> O                              | Mc         | 2.20      | 1.486, 1.391 |
| <b>Datolite</b><br>D. 401, DL. 2 (2)      | HCaBSiO <sub>5</sub>  | Mc         | 2.95      | 1.670, 1.625 |
| <b>Daubréeite</b><br>D. 194, W. 39        | Bi <sub>5</sub> O <sub>3</sub> (OH) <sub>6</sub> Cl <sub>3</sub>                                    | Am         | 6.45      | 1.915, 1.905 |
| <b>Daubréelite</b><br>H. 1 (1), DL. 4 (1) | FeCr <sub>2</sub> S <sub>4</sub>  | Is         | 5.00      | Op           |
| <b>Davidite</b><br>MA. 1, MT.             | Mixture of Ilmenite and Fergusonite ?   | —          | —         | —            |



| <i>Name and Reference.</i>              | <i>Composition.</i>  | <i>Cr.</i> | <i>G.</i> | <i>N.</i>    |
|---|--|------------|-----------|--------------|
| <b>Daviesite</b><br>D. 190, Dl. 4 (3)   | Pb, O, Cl  | Or         | ?         | 1.760, 1.744 |
| <b>Davyne</b><br>Dl. 2 (2), MA. 4       | 6NaAlSiO <sub>4</sub> · CaSO <sub>4</sub> · CaCl <sub>2</sub>  | Hx         | 2.50      | 1.519, 1.518 |
| <b>Dawsonite</b><br>D. 293, H. 1 (3)    | NaAl(OH) <sub>2</sub> CO <sub>3</sub>  | Or         | 2.40      | 1.596, 1.466 |
| <b>Dechenite</b><br>H. 1 (4), MT.       | PbV <sub>2</sub> O <sub>6</sub> ?  | ?          | 5.3       | ?            |
| <b>Dehrnite</b><br>AM. 15, MA. 4        | NaCa <sub>3</sub> (OH)(PO <sub>4</sub> ) <sub>2</sub> ?  | Hx         | 3.05      | 1.622, 1.614 |
| <b>Delafossite</b><br>H. 1 (4), AM. 7   | Cu <sub>2</sub> O · Fe <sub>2</sub> O <sub>3</sub>   | Hx         | 5.05      | Op           |
| <b>Delessite</b><br>D. 478, W. 376      | Ferroaluminous var. of Antigorite  | Mc         | —         | —            |
| <b>Delorenzite</b><br>Dl. 3 (1), MT.    | 2FeO · 2Y <sub>2</sub> O <sub>3</sub> · UO <sub>2</sub> · 24TiO <sub>2</sub>   | Or         | 4.7       | ?            |
| <b>Deltaite</b><br>AM. 15, MA. 4        | 8CaO · 5Al <sub>2</sub> O <sub>3</sub> · 4P <sub>2</sub> O <sub>5</sub> · 14H <sub>2</sub> O   | Hx         | 2.95      | 1.650, 1.641 |
| <b>Delvauxite</b><br>W. 142, Dl. 3 (1)  | Fe'' <sub>2</sub> (OH) <sub>3</sub> PO <sub>4</sub> · 9H <sub>2</sub> O  | Am         | 1.90      | 1.72         |
| <b>Derbylite</b><br>W. 157, Dl. 3 (1)   | 6FeO · Sb <sub>2</sub> O <sub>5</sub> · 6TiO <sub>2</sub> ?  | Or         | 4.55      | 2.51, 2.45   |
| <b>Descloizite</b><br>D. 564, Dl. 3 (1) | PbZn(OH)VO <sub>4</sub>  | Or         | 6.0       | 2.350, 2.185 |
| <b>Desmine</b><br>Dl. 2 (3), D. 443     | = Stilbite   | —          | —         | —            |
| <b>Destinezite</b><br>W. 121, Dl. 3 (1) | 2Fe <sub>2</sub> O <sub>3</sub> · 2SO <sub>3</sub> · P <sub>2</sub> O <sub>5</sub> · 12H <sub>2</sub> O =<br>Diadochite ?                      | Tc         | 2.10      | 1.665, 1.615 |
| <b>Deweylite</b><br>D. 482, W. 228      | H <sub>4</sub> Mg <sub>4</sub> (SiO <sub>4</sub> ) <sub>3</sub> · 4H <sub>2</sub> O  | Or ?       | 2.25      | 1.51         |
| <b>Dewindtite</b><br>Dl. 4 (2), MA. 3   | 3PbO · 5UO <sub>3</sub> · 2P <sub>2</sub> O <sub>5</sub> · 12H <sub>2</sub> O  | Or         | 4.90      | 1.763        |
| <b>Diabantite</b><br>W. 376, D. 476     | H <sub>4</sub> (Mg, Fe) <sub>3</sub> Si <sub>2</sub> O <sub>9</sub> +<br>H <sub>4</sub> (Mg, Fe) <sub>2</sub> Al <sub>2</sub> SiO <sub>9</sub> | Mc         | 2.80      | 1.611, 1.609 |
| <b>Diaboléite</b><br>MM. 20, Dl. 4 (3)  | CuPb <sub>2</sub> (OH) <sub>4</sub> Cl <sub>2</sub>  | Tt         | 6.40      | 1.98         |
| <b>Diadochite</b><br>D. 677, Dl. 3 (1)  | 2Fe <sub>2</sub> O <sub>3</sub> · 2SO <sub>3</sub> · P <sub>2</sub> O <sub>5</sub> · 12H <sub>2</sub> O  | Am         | 2.0       | 1.63         |
| <b>Diallage</b><br>W. 183, D. 325       | Lamellar form of Diopside  | —          | —         | —            |
| <b>Dialogite</b><br>D. 274, LF. 3       | = Rhodocrosite   | —          | —         | —            |
| <b>Diamond</b><br>D. 1, Dl. 1           | C  | Is         | 3.52      | 2.419        |
| <b>Diaphorite</b><br>D. 134, Dl. 4 (1)  | Ag <sub>3</sub> Pb <sub>2</sub> Sb <sub>3</sub> S <sub>8</sub>   | Or         | 6.10      | Op           |
| <b>Diaspore</b><br>D. 256, H. 1 (2)     | Al(OH)O  | Or         | 3.40      | 1.750, 1.702 |

| <i>Name and Reference.</i>               | <i>Composition.</i>   | <i>Cr.</i> | <i>G.</i> | <i>N.</i>    |
|--|---|------------|-----------|--------------|
| <b>Dickinsonite</b><br>DL 3 (1), AM. 15  | $\text{Na}_2\text{Mn}_2(\text{PO}_4)_4 \cdot \text{H}_2\text{O}$<br>Perhaps = Fillowite   | Mc         | 3-30      | 1-657, 1-653 |
| <b>Dickite</b><br>AM. 15, ACS. 13*       | $\text{H}_2\text{Al}_2\text{Si}_2\text{O}_6$  | Mc         | 2-62      | 1-566, 1-560 |
| <b>Didymolite</b><br>W. 277, MT.         | $\text{Ca}_2\text{Al}_2\text{Si}_2\text{O}_{12}$  | Mc         | 2-70      | 1-508, 1-493 |
| <b>Dienerite</b><br>DL 4 (1), MM. 21     | $\text{Ni}_2\text{As}$  | Is         | ?         | Op           |
| <b>Dietrichite</b><br>D. 771, DL 4 (2)   | $(\text{Fe}, \text{Zn})\text{Al}_2(\text{SO}_4)_2 \cdot 22\text{H}_2\text{O}$   | Mc         | ?         | 1-488, 1-475 |
| <b>Dietzite</b><br>W. 120, DL 4 (2)      | $\text{CaCrO}_4 \cdot \text{CaI}_2\text{O}_6$   | Mc         | 3-70      | 1-837, 1-825 |
| <b>Dihydrate</b><br>D. 569, W. 134       | $\text{Cu}_2(\text{OH})_2(\text{PO}_4)_2$   | To         | 4-30      | 1-805, 1-719 |
| <b>Diopside</b><br>D. 325A., W. 183      | $\text{CaMg}(\text{SiO}_3)_2$   | Mc         | 3-30      | 1-695, 1-665 |
| <b>Diophtase</b><br>D. 283, W. 221       | $\text{H}_2\text{CuSiO}_4$  | Hx         | 3-20      | 1-709, 1-657 |
| <b>Dipyre</b><br>W. 346-7, DL 2 (2)      | Calcareous var. of Marialite  | Tt         | —         | —            |
| <b>Disthene</b><br>D. 400, DL 2 (2)      | = Kyanite   | —          | —         | —            |
| <b>Dixenite</b><br>MA. 1, W. 156         | $\text{MnSiO}_3 \cdot 2\text{Mn}_2(\text{OH})\text{AsO}_2$  | Hx         | 4-20      | 1-96         |
| <b>Doelterite</b><br>MT.                 | $\text{H}_2\text{TlO}_4$  | Am         | ?         | ?            |
| <b>Dolerophanite</b><br>D. 738, DL 4 (2) | $\text{Cu}_2\text{OSO}_4$   | Mc         | ?         | ?            |
| <b>Dolomite</b><br>D. 271, H. 1 (3)      | $\text{CaMg}(\text{CO}_3)_2$  | Hx         | 2-90      | 1-680, 1-502 |
| <b>Domeykite</b><br>DL 4 (1), AM. 14     | $\text{Cu}_2\text{As}$  | Hx         | 7-55      | Op           |
| <b>Douglasite</b><br>W. 33, H. 1 (2)     | $\text{K}_2\text{Fe}^{++}\text{Cl}_4 \cdot 2\text{H}_2\text{O}$   | Mc         | 2-15      | 1-500, 1-488 |
| <b>Dravite</b><br>D. 426, MA. 4          | $\text{H}_2\text{NaMg}_2\text{Al}_4\text{B}_7\text{Si}_4\text{O}_{21}$ or<br>$\text{H}_2\text{NaMg}_2\text{Al}_4\text{B}_7\text{Si}_4\text{O}_{21}$ | Hx         | 3-05      | 1-635, 1-613 |
| <b>Dudgeonite</b><br>DL 3 (1)            | Calcareous var. of Annabergite  | —          | —         | —            |
| <b>Dudleyite</b><br>W. 285               | Alteration product of Margarite.<br>Doubtful species  | —          | —         | —            |
| <b>Dufrenite</b><br>W. 140, DL 3 (1)     | $2\text{FeO} \cdot 5\text{Fe}_2\text{O}_3 \cdot 2\text{P}_2\text{O}_5 \cdot 7\text{H}_2\text{O}$ or<br>$\text{Fe}^{+++}_2(\text{OH})_2\text{PO}_4$  | Mc         | 3-30      | 1-885, 1-835 |
| <b>Dufrenoyite</b><br>D. 127, DL 4 (1)   | (1) $\text{Pb}_2\text{As}_2\text{S}_4$<br>(2) Group name incl. Cosalite,<br>Plumosite, Weibullite, etc.   | Or<br>Mc   | 5-55      | Op           |

\* Jour. Amer. Ceramic Society, Vol. XIII (1930).

## 24 A KEY TO MINERAL GROUPS, SPECIES AND VARIETIES

| <i>Name and Reference.</i>               | <i>Composition.</i>   | <i>Cr.</i> | <i>G.</i> | <i>N.</i>    |
|--|---|------------|-----------|--------------|
| <b>Dumontite</b><br>Dl. 4 (2), MA. 3     | $2\text{PbO} \cdot 3\text{UO}_3 \cdot \text{P}_2\text{O}_5 \cdot 5\text{H}_2\text{O}$                             | Or         | ?         | 1·895, 1·885 |
| <b>Dumortierite</b><br>D. 427, Dl. 2 (2) | $\text{HAl}_5\text{BSi}_3\text{O}_{20}$   | Or         | 3·30      | 1·690, 1·678 |
| <b>Dundasite</b><br>H. 1 (3), DAp. 2     | $\text{PbAl}_2(\text{OH})_4(\text{CO}_3)_2 \cdot 2\text{H}_2\text{O}$   | ?          | 3·25      | 1·66         |
| <b>Durangite</b><br>D. 558, W. 148       | $\text{NaAlFAsO}_4$   | Mc         | 4·00      | 1·685, 1·634 |
| <b>Durdenite</b><br>D. 810, H. 1 (3)     | $\text{Fe}'''\text{}_2(\text{TeO}_3)_3 \cdot 4\text{H}_2\text{O}$   | Or         | ?         | 1·955, 1·715 |
| <b>Dussertite</b><br>W. 150, MA. 2       | $\text{Ca}_3\text{Fe}'''\text{}_3(\text{OH})_9(\text{AsO}_4)_2$   | Hx         | 3·75      | 1·85, 1·84   |
| <b>Dysanalyte</b><br>D. 519, Dl. 3 (1)   | $\text{CaTiO}_3 + \text{NaNbO}_3$ *   | Or         | 4·15      | 2·0          |
| <b>Dyscrasite</b><br>D. 35, H. 1 (1)     | $\text{Ag}_3\text{Sb}$  | Or         | 9·7       | Op           |
| <b>Dysluite</b><br>D. 236B., H. 1 (4)    | Manganiferous var. of Gahnite   | Is         | 4·5       | ?            |
| <b>Dyssnite</b><br>W. 196, MT.           | Alteration product of Rhodonite.<br>Doubtful species  | —          | —         | —            |
| <b>Eakleite</b><br>MA. 1, MA. 2          | = Xonotlite   | —          | —         | —            |
| <b>Eastonite</b><br>W. 366, MA. 3        | $\text{H}_4\text{K}_2\text{Mg}_5\text{Al}_4\text{Si}_5\text{O}_{24}$  | Mc         | 2·85      | 1·578, 1·542 |
| <b>Ecdemite</b><br>W. 154, Dl. 3 (1)     | $\text{Pb}_6\text{OCl}_4(\text{AsO}_3)_2$   | Or         | 7·0       | 2·32, 2·25   |
| <b>Echellite</b><br>W. 395, MA. 1        | $\text{H}_{24}\text{Na}_2\text{Ca}_2\text{Al}_{12}\text{Si}_9\text{O}_{51}$                                       | Or         | ?         | 1·545, 1·530 |
| <b>Ectropite</b><br>AM. 10, MM. 18       | = Bementite   | —          | —         | —            |
| <b>Edenite</b><br>D. 338, Dl. 2 (1)      | Aluminous var. of Tremolite   | Mc         | 3·10      | 1·631, 1·612 |
| <b>Edingtonite</b><br>D. 452, W. 395     | $\text{BaAl}_2\text{Si}_3\text{O}_{10} \cdot 3\text{H}_2\text{O}$   | Or         | 2·75      | 1·554, 1·539 |
| <b>Eggonite</b><br>AM. 15, MT.           | H, Al, $\text{PO}_4$ . Doubtful species   | Or         | ?         | 1·590        |
| <b>Eglestonite</b><br>W. 36, Dl. 4 (3)   | $\text{Hg}_4\text{OCl}_2$   | Is         | 8·35      | 2·49         |
| <b>Eichbergite</b><br>Dl. 4 (1), MT.     | $\text{Cu}(\text{Bi}, \text{Sb})_3\text{S}_5$   | Or?        | ?         | Op           |
| <b>Eichwaldite</b><br>H. 1 (4), MT       | $\text{AlBO}_3$ . Possibly = Eremeyevite  | Or?        | ?         | ?            |
| <b>Ekmanite</b><br>D. 2 (1), MA. 2       | $\text{H}_{10}(\text{Fe}, \text{Mn})_3(\text{Al}, \text{Fe})_4\text{Si}_8\text{O}_{32} \cdot 2\text{H}_2\text{O}$ | Mc         | 2·67      | 1·584, 1·576 |
| <b>Elaeolite</b><br>D. 357, H. 2         | = Nephelite   | —          | —         | —            |

\* MA. 3, 23. Also Dl. 3 (1), 94.

| <i>Name and<br/>References.</i>             | <i>Composition.</i>  | <i>Cr.</i> | <i>G.</i> | <i>N.</i>    |
|---|--|------------|-----------|--------------|
| <b>Elbaite</b><br>D. 428, W. 246            | $H_2NaLi_2Al_2B_2Si_2O_{12}$ or<br>$H_2Na_2Li_2Al_2B_2Si_2O_{12}$                                      | Hx         | 3.05      | 1.647, 1.629 |
| <b>Elbrusite</b><br>AM. 15                  | Mixt. of Nontzonite, Muscovite, etc.   | —          | —         | —            |
| <b>Electrum</b><br>D. 13, H. 1 (1)          | AuAg   | Is         | 14.9      | Op           |
| <b>Ellsworthite</b><br>W. 159, MA. 2        | Ca, Fe <sup>+++</sup> , Th, U <sup>+</sup> , Nb, O, H <sub>2</sub> O                                   | Is ?       | 3.70      | 1.74 +       |
| <b>Elpasolite</b><br>DL. 4 (3), H. 1 (2)    | K <sub>2</sub> AlF <sub>6</sub>  | Is         | ?         | ?            |
| <b>Elpidite</b><br>DL. 3 (1), DAp. 1        | H <sub>2</sub> Na <sub>2</sub> Zr(SiO <sub>3</sub> ) <sub>2</sub>                                      | Or         | 2.55      | 1.574, 1.560 |
| <b>Embolite</b><br>D. 179, DL. 4 (3)        | Ag <sub>2</sub> ClBr   | Is         | 5.8       | 2.15         |
| <b>Embrithite</b><br>DL. 4 (1), JWAS        | Pb <sub>2</sub> Sb <sub>2</sub> S <sub>4</sub>   | ?          | 6.25      | Op           |
| <b>Emerald</b><br>D. 344, BPS.              | Green Beryl of gem quality   | —          | —         | —            |
| <b>Emmonsite</b><br>D. 809, DL. 4 (1)       | Fe <sub>2</sub> O <sub>3</sub> · 4TeO <sub>3</sub> · H <sub>2</sub> O ?                                | Ms         | 4.7       | 2.10, 1.95   |
| <b>Empiectite</b><br>D. 116, DL. 4 (1)      | CaBiS <sub>3</sub>   | Or         | 6.4       | Op           |
| <b>Empressite</b><br>DAp. 3, DL. 4 (1)      | AgTe   | ?          | 7.50      | Op           |
| <b>Enargite</b><br>D. 158, DL. 4 (1)        | Cu <sub>3</sub> AsS <sub>4</sub>   | Or         | 4.45      | Op           |
| <b>Enceladite</b><br>M.Y.                   | = Warwickite   | —          | —         | —            |
| <b>Endlichite</b><br>D. 552, DL. 3 (1)      | Arsenical var. of Vanadinite   | Hx         | 6.85      | 2.348, 2.311 |
| <b>Englishite</b><br>AM. 15, MA. 4          | KCa <sub>2</sub> Al <sub>2</sub> (OH) <sub>2</sub> (PO <sub>3</sub> ) <sub>4</sub> · 5H <sub>2</sub> O | Or         | 2.65      | 1.572, 1.570 |
| <b>Enigmatite</b><br>W. 216                 | = Assignmatite   | —          | —         | —            |
| <b>Enstatite</b><br>D. 323, W. 176          | MgSiO <sub>3</sub>   | Or         | 3.20      | 1.66, 1.65   |
| <b>Enstatite-Augite</b><br>MM. 19           | = Pigeonite  | —          | —         | —            |
| <b>Enstatite</b><br>W. 173                  | = Enstatite  | —          | —         | —            |
| <b>Epsite</b><br>DL. 4 (3), MT.             | Fe <sub>2</sub> N <sub>2</sub> MnO <sub>10</sub>   | Ti         | ?         | ?            |
| <b>Eosphorite</b><br>D. 850, DL. 3 (1)      | MnAl(OH) <sub>2</sub> PO <sub>3</sub> · H <sub>2</sub> O   | Or         | 3.15      | 1.66, 1.63   |
| <b>Epiboulangerite</b><br>D. 161, DL. 4 (1) | = Embrithite   | —          | —         | —            |
| <b>Epidesmine</b><br>W. 294, DL. 2 (3)      | CsAl <sub>2</sub> Si <sub>2</sub> O <sub>10</sub> · 6H <sub>2</sub> O                                  | Or         | 2.15      | 1.500, 1.485 |

| <i>Name and Reference.</i>                 | <i>Composition.</i>  | <i>Cr.</i> | <i>G.</i> | <i>N.</i>    |
|--|--|------------|-----------|--------------|
| <b>Epididymite</b><br>W. 243, Dl. 2 (1)    | $\text{HNaBeSi}_3\text{O}_8$   | Or         | 2.55      | 1.550, 1.545 |
| <b>Epidote</b><br>D. 407, Dl. 2 (2)        | (1) $\text{HCa}_2(\text{Al, Fe})_3\text{Si}_3\text{O}_{13}$ , i.e.<br>Ferriferous var. of Clinzoisite.<br>(2) Group name incl. Allanite, Hancockite, Zoisite, etc. | Mc         | 3.45      | 1.775, 1.731 |
| <b>Epigenite</b><br>D. 162, Dl. 4 (1)      | $\text{Cu}_6\text{Fe}_3\text{As}_4\text{S}_{15}$   | Or         | 4.5       | Op           |
| <b>Epistilbite</b><br>W. 402, Dl. 2 (3)    | $\text{H}_4\text{CaAl}_2(\text{SiO}_3)_6 \cdot 3\text{H}_2\text{O}$  | Mc         | 2.25      | 1.512, 1.502 |
| <b>Epistolite</b><br>W. 407, Dl. 3 (1)     | $7\text{H}_2\text{O} \cdot 5\text{Na}_2\text{O} \cdot \text{NaF} \cdot 5\text{SiO}_2 \cdot$<br>$\text{TiO}_2 \cdot \text{Nb}_2\text{O}_5$                          | Mc         | 2.90      | 1.682, 1.610 |
| <b>Epsomite</b><br>D. 748, H. 1 (3)        | (1) $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$<br>(2) Group name incl. Goslarite and Morenosite   | Or         | 1.68      | 1.461, 1.433 |
| <b>Eremeyevite</b><br>D. 692, H. 1 (4)     | $\text{AlBO}_3$  | Or         | 3.30      | 1.64         |
| <b>Erikite</b><br>Dap. 2, MT.              | Mixt. of Monazite and Hydronephelite ?   | —          | —         | —            |
| <b>Erinite</b><br>D. 568, W. 132           | $\text{Cu}_5(\text{OH})_4(\text{AsO}_4)_2$   | Or         | 4.05      | 1.880, 1.820 |
| <b>Eriochalcite</b><br>AM. 12, H. 1 (2)    | $\text{CuCl}_2 \cdot 2\text{H}_2\text{O}$  | Or ?       | 3.05      | ?            |
| <b>Erionite</b><br>W. 395, MT.             | $\text{KNaCaAl}_4(\text{Si}_3\text{O}_8)_4 \cdot 12\text{H}_2\text{O}$   | Or         | 2.0       | 1.452, 1.438 |
| <b>Errite</b><br>W. 221, MA. 2             | Var. of Parsettensite ?  | Hx ?       | 2.70      | 1.575, 1.547 |
| <b>Erythrite</b><br>D. 601, Dl. 3 (1)      | $\text{Co}_3(\text{AsO}_4)_2 \cdot 8\text{H}_2\text{O}$  | Mc         | 2.90      | 1.699, 1.626 |
| <b>Erythrosiderite</b><br>D. 199, H. 1 (2) | $\text{K}_2\text{FeCl}_5 \cdot \text{H}_2\text{O}$   | Or         | 2.32      | 1.68         |
| <b>Eschwegéite</b><br>AM. 12, MM. 21       | = Euxenite   | —          | —         | —            |
| <b>Ettringite</b><br>W. 115, H. 1 (3)      | $\text{Ca}_{10}\text{Al}_4(\text{OH})_{22}(\text{SO}_4)_5 \cdot 48\text{H}_2\text{O} ?$  | Hx         | 1.77,     | 1.47, 1.46   |
| <b>Eucairite</b><br>D. 51, Dl. 4 (1)       | $\text{CuAgSe}$  | Is         | 7.65      | Op           |
| <b>Euchroite</b><br>D. 632, Dl. 3 (1)      | $\text{Cu}_2(\text{OH})\text{AsO}_4 \cdot 3\text{H}_2\text{O}$   | Or         | 3.40      | 1.733, 1.695 |
| <b>Euclase</b><br>D. 403, W. 352           | $\text{HBeAlSiO}_5$  | Mc         | 3.10      | 1.671, 1.651 |
| <b>Eucolite</b><br>W. 242, H. 2            | Cerium-bearing var. of Eudialite   | Hx         | 3.05      | 1.620, 1.618 |
| <b>Eucryptite</b><br>D. 358, W. 271        | $\text{LiAlSiO}_4$   | Hx         | 2.65      | 1.545, 1.540 |
| <b>Eudialite</b><br>D. 345, H. 2           | $\text{Na}_5\text{Ca}_2\text{ZrCl}(\text{SiO}_3)_7 ?$  | Hx         | 2.95      | 1.612, 1.609 |

A KEY TO MINERAL GROUPS, SPECIES AND VARIETIES 27

| <i>Name and Reference.</i>                      | <i>Composition.</i>   | <i>Cr.</i> | <i>G.</i>        | <i>N.</i>    |
|---|---|------------|------------------|--------------|
| <b>Eudidymite</b><br>D. 312, W. 244             | $\text{HNaBeSi}_3\text{O}_8$  | Mc         | 2.55             | 1.551, 1.545 |
| <b>Eulytite</b><br>D. 368, W. 232               | $\text{Bi}_4(\text{SiO}_4)_3$   | Is         | 6.10             | 2.05         |
| <b>Euxenite</b><br>D. 534, DL. 3 (1)            | (1) $\text{YTi}_2\text{NbO}_8(+\text{CaTiNb}_2\text{O}_8)$<br>(2) Group name incl. Tanteuxenite.<br>Polycrase, etc. | Or         | 4.6<br>to<br>5.2 | 2.1          |
| <b>Evansite</b><br>D. 645, DL. 3 (1)            | $\text{Al}_3(\text{OH})_6\text{PO}_4 \cdot 6\text{H}_2\text{O}$   | Am         | 1.90             | 1.485        |
| <b>Fahlore</b><br>D. 148, DL. 4 (1)             | Group name incl. Freibergite, Tennantite, Tetrahedrite and varieties  | —          | —                | —            |
| <b>Fairfieldite</b><br>D. 592, W. 127           | $\text{Ca}_2\text{Mn}(\text{PO}_4)_2 \cdot 2\text{H}_2\text{O}$   | Tc         | 3.05             | 1.656, 1.637 |
| <b>Falkenhaynite</b><br>DL. 4 (1), JWAS. 11     | = Stylotypite   | —          | —                | —            |
| <b>Famatinitite</b><br>D. 159, DL. 4 (1)        | $\text{Cu}_3\text{SbS}_4$   | Or         | 4.55             | Op           |
| <b>Faratsihite</b><br>W. 239, DAp. 3            | Mixt. of Kaolin and Nontronite  | —          | —                | —            |
| <b>Faroelite</b><br>D. 456, AM. 10              | = Thomsonite  | —          | —                | —            |
| <b>Fassaite</b><br>W. 166, H. 2                 | = Augite  | —          | —                | —            |
| <b>Faujasite</b><br>DL. 2 (3), W. 389           | $\text{Na}_2\text{CaAl}_4\text{Si}_{10}\text{O}_{28} \cdot 20\text{H}_2\text{O}$                                    | Is         | 1.92             | 1.48         |
| <b>Fauserite</b><br>H. 1 (3), MT.               | Manganiferous var. of Epsomite  | Or         | 1.89             | ?            |
| <b>Fayalite</b><br>D. 377, DL. 2 (1)            | $\text{Fe}_2\text{SiO}_4$   | Or         | 4.25             | 1.875, 1.825 |
| <b>Feldspar (Felspar)</b><br>D. 313-320, W. 277 | Group name incl. Albite, Anorthite, Celsian, Microcline, etc.   | —          | —                | —            |
| <b>Felsobanyite</b><br>D. 793, H. 1 (3)         | $\text{Al}_4(\text{OH})_{10}\text{SO}_4 \cdot 5\text{H}_2\text{O}$  | Or         | 2.33             | 1.538, 1.519 |
| <b>Feranthophyllite</b><br>W. 202, MA. 4        | $\text{H}_2\text{Fe}_7(\text{SiO}_3)_8$   | Or         | 3.5              | 1.72, 1.70   |
| <b>Feraxinite</b><br>W. 253                     | = Axinite   | —          | —                | —            |
| <b>Ferberite</b><br>D. 812, DL. 4 (2)           | $\text{FeWO}_4$   | Mc         | 7.40             | 2.40, AO.    |
| <b>Ferganite</b><br>MM. 20                      | = Tyuyamunite   | —          | —                | —            |
| <b>Fergusonite</b><br>D. 523, H. 1 (4)          | $\text{Y}_2\text{Nb}_2\text{O}_8 (+\text{H}_2\text{O}?)$  | Tt         | 4.3-<br>5.8      | 2.15         |
| <b>Fermorite</b><br>W. 130, DL. 3 (1)           | Strontium bearing var. of Apatite   | Hx         | 3.50             | 1.660, 1.655 |

## 28 A KEY TO MINERAL GROUPS, SPECIES AND VARIETIES

| <i>Name and Reference.</i>                   | <i>Composition.</i>  | <i>Cr.</i> | <i>G.</i> | <i>N.</i>               |
|--|--|------------|-----------|-------------------------|
| <b>Fernandinite</b><br>W. 146, MA. 1         | $\text{CaO} \cdot \text{V}_2\text{O}_4 \cdot 5\text{V}_2\text{O}_5 \cdot 14\text{H}_2\text{O}$   | ?          | ?         | 2.05                    |
| <b>Ferrierite</b><br>AM. 4, MA. 1            | $\text{Na}_2\text{MgAl}_2\text{Si}_{10}\text{O}_{25} \cdot 6\text{H}_2\text{O}$  | Or         | 2.15      | 1.482, 1.478            |
| <b>Ferrimolybdate</b><br>D. 219, DL. 4 (3)   | $\text{Fe}_2\text{O}_3 \cdot 3\text{MoO}_3 \cdot 8\text{H}_2\text{O}$ or<br>$\text{Fe}_2\text{O}_3 \cdot 4\text{MoO}_3 \cdot 10\text{H}_2\text{O}$ | Or         | 3.00      | 1.87-2.05,<br>1.72-1.78 |
| <b>Ferrinatrium</b><br>D. 777, H. 1 (3)      | $\text{Na}_3\text{Fe}'''\text{(SO}_4)_3 \cdot 3\text{H}_2\text{O}$   | Hx         | 2.55      | 1.627, 1.556            |
| <b>Ferrisymplesite</b><br>W. 126, MA. 2      | $\text{Fe}'''\text{(OH)}_3(\text{AsO}_4)_2 \cdot 6\text{H}_2\text{O}$  | ?          | 2.90      | 1.65                    |
| <b>Ferritungstite</b><br>D. 220, H. 1 (3)    | $\text{Fe}_2\text{O}_3 \cdot \text{WO}_3 \cdot 6\text{H}_2\text{O}$  | Hx         | ?         | 1.80, 1.72              |
| <b>Ferroanthophyllite</b><br>MT.             | = Feranthophyllite   | —          | —         | —                       |
| <b>Ferrocolumbite</b><br>MT.                 | = Columbite  | —          | —         | —                       |
| <b>Ferrodolomite</b><br>W. 75, H. 1 (3)      | $\text{CaFe}(\text{CO}_3)_2$   | Hx         | 3.30      | ?                       |
| <b>Ferropallidite</b><br>DL. 4 (2), H. 1 (3) | $\text{FeSO}_4 \cdot \text{H}_2\text{O}$   | Mc         | 3.10      | ?                       |
| <b>Ferrotantalite</b><br>MT.                 | = Tantalite  | —          | —         | —                       |
| <b>Ferrothorite</b><br>MM. 21, AM. 14        | Ferruginous var. of Thorite  | —          | —         | —                       |
| <b>Fersmanite</b><br>MA. 4, AM. 16           | $\text{Na}_4\text{Ca}_4\text{F}_4\text{Ti}_4\text{Si}_3\text{O}_{18}$  | Mc         | ?         | 1.939, 1.886            |
| <b>Fibroferrite</b><br>D. 788, DL. 4 (2)     | $\text{Fe}'''\text{(OH)SO}_4 \cdot 5\text{H}_2\text{O}$ = Copiapite ?  | Mc         | 1.85      | 1.575, 1.533            |
| <b>Fibrolite</b><br>D. 399, DL. 2 (2)        | = Sillimanite  | —          | —         | —                       |
| <b>Fiedlerite</b><br>D. 191, W. 38           | $\text{Pb}_3(\text{OH})_2\text{Cl}_4$  | Mc         | 5.90      | 2.13, 1.82              |
| <b>Fillowite</b><br>D. 589, DL. 3 (1)        | $\text{Na}_2\text{Mn}_5(\text{PO}_4)_4 \cdot \text{H}_2\text{O}$   | Mc         | 3.45      | 1.676, 1.672            |
| <b>Finnemannite</b><br>W. 154, MA. 2         | $\text{Pb}_5\text{Cl}(\text{AsO}_3)_3$   | Hx         | 7.25      | 2.295, 2.285            |
| <b>Fischerite</b><br>D. 640, LS.             | = Wavellite  | —          | —         | —                       |
| <b>Fizelyite</b><br>MA. 3, DL. 4 (1)         | $\text{Pb}_5\text{Ag}_2\text{Sb}_5\text{S}_{18}$   | Mc ?       | ?         | Op                      |
| <b>Flajolotite</b><br>DL. 3 (1), MM. 16      | $4\text{Fe}'''\text{SbO}_4 \cdot 3\text{H}_2\text{O}$  | Am         | ?         | ?                       |
| <b>Flinkite</b><br>W. 150, DL. 3 (1)         | $\text{Mn}''_2\text{Mn}'''\text{(OH)}_4\text{AsO}_4$   | Or         | 3.85      | 1.834, 1.783            |
| <b>Flint</b><br>D. 210                       | = Concretionary Chalcedony from<br>sediments   | —          | —         | —                       |
| <b>Florencite</b><br>W. 140, DL. 3 (1)       | $\text{Al}_3\text{Ce}(\text{OH})_6(\text{PO}_4)_2$   | Hx         | 3.60      | 1.685, 1.680            |
| <b>Fluellite</b><br>W. 32, DL. 4 (3)         | $\text{AlF}_3 \cdot \text{H}_2\text{O}$  | Or         | 2.17      | 1.511, 1.473            |

| <i>Name and Reference.</i>                 | <i>Composition.</i>   | <i>Cr.</i>     | <i>G.</i> | <i>N.</i>    |
|--|---|----------------|-----------|--------------|
| <b>Fluoborite</b><br>MA. 3, AM. 14         | $Mg_3F_3BO_3$   | Hx             | 2.90      | 1.566, 1.528 |
| <b>Fluocerite</b><br>D. 196, DL. 4 (3)     | $(Ce, La)F_3$ or $(Ce, La)_2OF_4$   | Hx             | 5.75      | 1.616, 1.610 |
| <b>Fluocollophanite</b><br>W. 157, LF. 4   | Doubtful species, probably mixture of apatite, etc.                             | —              | —         | —            |
| <b>Fluorapatite</b><br>D. 549, DL. 3 (1)   | = Apatite   | —              | —         | —            |
| <b>Fluorite</b><br>D. 175, H. 1 (2)        | $CaF_2$   | Is             | 3.15      | 1.434        |
| <b>Fluorspar</b><br>D. 175.                | = Fluorite  | —              | —         | —            |
| <b>Fluotaramite</b><br>MA. 3, MT.          | Fluorine-bearing var. of Riebeckite   | Mc             | 3.27      | 1.66         |
| <b>Forbesite</b><br>D. 625, DL. 3 (1)      | $H(Ni, Co)AsO_4 \cdot 4H_2O$  | ?              | 3.10      | ?            |
| <b>Forsterite</b><br>D. 375, W. 166        | $Mg_2SiO_4$   | Or             | 3.22      | 1.670, 1.635 |
| <b>Foshagite</b><br>W. 227, MA. 2          | = Hillebrandite   | —              | —         | —            |
| <b>Foucherite</b><br>W. 154, MA. 2         | Probably = Borickite  | Am             | 2.7       | 1.648        |
| <b>Fourmarierite</b><br>MA. 3, DL. 4 (2)   | $PbO \cdot 4UO_3 \cdot 5H_2O$ ?   | Or             | 6.05      | 1.92         |
| <b>Fowlerite</b><br>W. 196, H. 2           | Zinkiferous var. of Rhodonite   | Tc             | 3.65      | 1.72, 1.70   |
| <b>Fraipontite</b><br>MA. 3, AM. 13        | $Zn_3Al_1(OH)_8(SiO_4)_6 \cdot 7H_2O$   | Biax.          | ?         | ?            |
| <b>Franckeite</b><br>DL. 4 (1), DAp. 1     | $Pb_5Sn_2Sb_2S_{12}$  | Or<br>or<br>Mc | 5.90      | Op           |
| <b>Francolite</b><br>W. 156, DL. 3 (1)     | $Ca_{10}F_2(CO_3)(PO_4)_6 \cdot H_2O$ ;<br>possibly impure Apatite              | Hx             | 3.1       | 1.620, 1.615 |
| <b>Franklandite</b><br>H. 1 (4), D. 708    | Probably a mixture of Ulexite, etc.   | —              | —         | —            |
| <b>Franklinite</b><br>D. 239, H. 1 (4)     | $(Zn, Mn)O \cdot Fe_2O_3$   | Is             | 5.15      | 2.36, AO.    |
| <b>Freibergite</b><br>AJS. 11, DL. 4 (1)   | $(Cu, Ag)_{10}(Cu, Fe)_2Sb_4S_{13}$ = Argenti-<br>tiferous var. of Tetrahedrite | Is             | 4.9       | Op           |
| <b>Freirinite</b><br>W. 147, MA. 2         | $6Na_2O \cdot 3CaO \cdot 9CuO \cdot 4As_2O_5 \cdot$<br>$12H_2O$ ?               | Tt ?           | 3.3+      | 1.748, 1.645 |
| <b>Freieslebenite</b><br>D. 135, DL. 4 (1) | $Ag_3Pb_2Sb_3S_8$   | Mc             | 6.15      | Op           |
| <b>Fremontite</b><br>DAp. 3, H. 1 (4)      | $NaAlFPO_4$   | Tc             | 3.05      | 1.62, 1.60   |



## 30 A KEY TO MINERAL GROUPS, SPECIES AND VARIETIES

| <i>Name and Reference.</i>                     | <i>Composition.</i>  | <i>Cr.</i> | <i>G.</i>    | <i>N.</i>            |
|--|--|------------|--------------|----------------------|
| <b>Friedelite</b><br>W. 220, Dl. 2 (1)         | $H_7Mn_5Cl(SiO_4)_4$ or $H_9Mn_8Cl(SiO_4)_6$                       | Hx         | 3.05         | 1.655, 1.625         |
| <b>Frieseite</b><br>Dl. 4 (1), MA. 1           | = Sternbergite   | —          | —            | —                    |
| <b>Fuchsite</b><br>D. 458, Dl. 2 (2)           | Chromiferous var. of Muscovite                                     | Mc         | 2.95         | 1.60, 1.55           |
| <b>Fulgurite</b><br>BSF. 38, MA. 1             | Structural var. of Lechatelierite                                  | —          | —            | —                    |
| <b>Fuloppite</b><br>MM. 21, AM. 14             | $Pb_3Sb_8S_{15}$   | Mc         | 5.25         | Op                   |
| <b>Gadolinite A and B</b><br>D. 404, Dl. 2 (2) | (A) $Be_2Fe''Y_2Si_2O_{10}$<br>(B) $Be_2Fe''Y_2Si_2O_{10}(+H_2O?)$ | Mc<br>Am   | 4.45<br>4.25 | 1.782, 1.772<br>1.78 |
| <b>Gageite</b><br>Dl. 2 (1), MA. 3             | = Tephroite  | —          | —            | —                    |
| <b>Gahnite</b><br>D. 236, H. 1 (4)             | $ZnAl_2O_4$  | Is         | 4.55         | 1.812                |
| <b>Gajite</b><br>Dl. 1, H. 1 (3)               | $CaMg(OH)_2CO_3$   | Hx         | 2.62         | ?                    |
| <b>Galena</b><br>D. 45, Dl. 4 (1)              | (1) PbS<br>(2) Group name incl. Clausthalite and Altaite           | Is         | 7.50         | Op                   |
| <b>Galenobismutite</b><br>D. 118, Dl. 4 (1)    | $PbBi_2S_4$  | ?          | 6.90         | Op                   |
| <b>Ganomalite</b><br>D. 355, W. 220            | $Ca_4Pb_6(OH)_2Si_6O_{21}$   | Hx         | 5.70         | 1.945, 1.910         |
| <b>Ganophyllite</b><br>D. 432, W. 373          | $Mn_7Al_2Si_8O_{26} \cdot 6H_2O$                                   | Mc         | 2.85         | 1.730, 1.705         |
| <b>Garnet</b><br>D. 370, W. 257,<br>AM. 12     | Group name, incl. Almandite, Andradite, Grossularite, Pyrope, etc. | —          | —            | —                    |
| <b>Garnierite</b><br>Dl. 2 (1), W. 229         | $H_4(Ni, Mg)_6Si_4O_{15}?$<br>= Genthite (Dl)                      | Or?        | 2.3–<br>2.8  | 1.59                 |
| <b>Gastaldite</b><br>W. 210, H. 2              | Highly aluminous var. of Glauco-phane                              | Tc         | 3.05         | 1.65, 1.63           |
| <b>Gaylussite</b><br>D. 297, H. 1 (3)          | $Na_2Ca(CO_3)_2 \cdot 5H_2O$                                       | Mc         | 1.94         | 1.523, 1.443         |
| <b>Gearksutite</b><br>D. 207, Dl. 4 (3)        | $CaF_2 \cdot Al(F, OH)_3 \cdot H_2O$                               | Mc         | 2.72         | 1.456, 1.448         |
| <b>Gedrite</b><br>D. 337A, Dl. 2 (1)           | $H_2Mg_7Si_8O_{24} + H_2Mg_4Al_6Si_5O_{21}$                        | Or         | 3.15         | 1.644, 1.623         |
| <b>Gehlenite</b><br>D. 392, AM. 14             | $Ca_2Al_2SiO_7$  | Tt         | 3.00         | 1.669, 1.658         |
| <b>Geikielite</b><br>D. 68, Dl. 3 (1)          | $MgTiO_3$  | Hx         | 4.05         | 2.31, 1.95           |

| Name and Reference.                     | Composition.  | Cr.  | G.   | N.           |
|---|---|------|------|--------------|
| <b>Genette</b><br>AM. 13, MA. 3         | = Sarcosite ?   | Ti   | 3-15 | 1-707, 1-698 |
| <b>Genthite</b><br>D. 483, DL. 2 (1)    | $H_2Mg_2Ni_2(SiO_3)_2 \cdot 4H_2O$  | Or ? | 2-40 | ?            |
| <b>Geocronite</b><br>D. 152, DL. 4 (1)  | $Pb_2Sb_2S_4$   | Or   | 6-45 | Op           |
| <b>Georgiadite</b><br>W. 132, DL. 3 (1) | $Pb_2/3AsO_4$   | Or   | 7-1  | 2-1          |
| <b>Gerhardtite</b><br>D. 688, H. 1 (3)  | $Ca_2(OH)_2NO_2$  | Or   | 3-40 | 1-722, 1-703 |
| <b>Germanite</b><br>DL. 4 (1) MA. 3     | $10Ca_2S \cdot 4GeS_2 \cdot As_2S_4^*$  | Is ? | ?    | Op           |
| <b>Gerstorfite</b><br>D. 80, DL. 4 (1)  | $NiAsS$   | Is   | 6-60 | Op           |
| <b>Gibbsite</b><br>D. 264, W. 48        | $Al(OH)_3$  | Mc   | 2-22 | 1-583, 1-561 |
| <b>Glaucokite</b><br>W. 270, DL. 2 (2)  | = Muscovite   | —    | —    | —            |
| <b>Grauwolite</b><br>D. 438B, DL. 2 (2) | Impure Muscovite  | —    | —    | —            |
| <b>Gilneasite</b><br>W. 164, MA. 1      | $Fe^{++}BaSi_2O_{10}$   | Ti   | 3-35 | 1-621, 1-619 |
| <b>Gilpinite</b><br>AM. 11, MA. 3       | = Johannite   | —    | —    | —            |
| <b>Glenite</b><br>D. 444, W. 209        | $KCa_{10}Al_{10}Si_{10}O_{40} \cdot 38H_2O +$<br>$K_2Ca_2Al_2Si_2O_{10} \cdot 38H_2O$ | Mc   | 2-27 | 1-548, 1-531 |
| <b>Gladite</b><br>DSV. 12, MA. 2        | $2PbS \cdot Ca_2S \cdot 5Bi_2S_3$   | Mc ? | 6-95 | Op           |
| <b>Glauberite</b><br>D. 718, H. 1 (3)   | $Na_2Ca(SO_4)_2$  | Mc   | 2-75 | 1-536, 1-515 |
| <b>Glaucobroite</b><br>W. 165, MA. 2    | $CaMnSO_4$  | Or   | 3-40 | 1-729, 1-679 |
| <b>Glaucodol</b><br>D. 101, DL. 4 (1)   | $CaFeAs_2S_2$   | Or   | 6-65 | Op           |
| <b>Glaucosite</b><br>D. 490, DL. 2 (3)  | $KMgFe^{++}_2(SO_4)_2 \cdot 3H_2O$  | Mc   | 2-75 | 1-63, 1-61   |
| <b>Glaucophane</b><br>D. 338, W. 208    | $H_2Na_2Mg_2Al_2(SO_4)_2$<br>(+ $H_2Fe^{++}_2(SO_4)_2$ )                              | Mc   | 3-10 | 1-639, 1-621 |
| <b>Glockerite</b><br>D. 782, H. 1 (3)   | $Fe^{++}_2(OH)_2SO_4 \cdot H_2O$  | ?    | ?    | 1-81, 1-76   |
| <b>Gmelinite</b><br>D. 448, W. 202      | $(Na_2CaAl_2Si_2O_{10} +$<br>$Na_2Al_2Si_2O_{10}) + 38H_2O$                           | Mc   | 2-19 | 1-472, 1-468 |
| <b>Gonite</b><br>D. 227, DL. 3 (2)      | (1) $Fe^{++}(OH)O$<br>(2) Group name incl. Diaspore<br>and Margarite                  | Or   | 4-39 | 2-400, 2-290 |

\* De Jong (Z.K. 73) gives  $Ca_2Fe \cdot GeS_2$

| <i>Name and Reference.</i>                    | <i>Composition.</i>  | <i>Cr.</i> | <i>G.</i>     | <i>N.</i>    |
|---|--|------------|---------------|--------------|
| <b>Gold</b><br>D. 13, DL. 3 (2)               | Au(+ Ag)   | Is         | 14.9-<br>19.3 | Op           |
| <b>Goldfieldite</b><br>DL. 4 (1), JWAS.<br>11 | Impure Famatinite  | —          | —             | —            |
| <b>Gonnardite</b><br>W. 394, LF. 2            | (Na <sub>2</sub> , Ca) <sub>2</sub> Al <sub>2</sub> Si <sub>5</sub> O <sub>15</sub> · 5H <sub>2</sub> O ?        | Or ?       | 2.25          | 1.520, 1.514 |
| <b>Goongarrite</b><br>DL. 4 (1), MA. 2        | Pb <sub>4</sub> Bi <sub>2</sub> S <sub>7</sub>   | Mc ?       | 7.30          | Op           |
| <b>Gorceixite</b><br>W. 149, DL. 3 (1)        | BaAl <sub>3</sub> (OH) <sub>5</sub> (PO <sub>4</sub> ) <sub>2</sub> · H <sub>2</sub> O                           | Hx         | 3.10          | 1.625        |
| <b>Gordonite</b><br>AM. 15, MA. 4             | MgAl <sub>2</sub> (OH) <sub>2</sub> (PO <sub>4</sub> ) <sub>2</sub> · 8H <sub>2</sub> O                          | Tc         | 2.28          | 1.558, 1.534 |
| <b>Goslarite</b><br>D. 749, H. 1 (3)          | ZnSO <sub>4</sub> · 7H <sub>2</sub> O  | Or         | 1.97          | 1.490, 1.462 |
| <b>Goyazite</b><br>D. 657, W. 149             | = Hamlinite  | —          | —             | —            |
| <b>Graftonite</b><br>H. 1 (4), DAp. 2         | CaFe'' <sub>2</sub> (PO <sub>4</sub> ) <sub>2</sub>  | Mc         | 3.65          | 1.725, 1.704 |
| <b>Grandidierite</b><br>W. 250, LM. 1         | H <sub>2</sub> Na <sub>2</sub> Mg <sub>7</sub> Al <sub>20</sub> B <sub>2</sub> Si <sub>7</sub> O <sub>56</sub> ? | Or         | 3.00          | 1.639, 1.602 |
| <b>Graphite</b><br>D. 2, DL. 1                | C  | Hx         | 2.25          | Op           |
| <b>Greenalite</b><br>W. 232, DAp. 2           | FeSiO <sub>3</sub> · xH <sub>2</sub> O   | Am         | 2.8           | 1.652        |
| <b>Greenockite</b><br>D. 68, DL. 4 (1)        | CdS  | Hx         | 4.85          | 2.529, 2.506 |
| <b>Griffithite</b><br>W. 371, MA. 1           | Probably = Jefferisite   | Hx ?       | 2.31          | 1.572, 1.485 |
| <b>Griphite</b><br>W. 151, DL. 3 (1)          | Mn, Ca, Na, PO <sub>4</sub> , H <sub>2</sub> O   | Am         | 3.40          | 1.64         |
| <b>Grossularite</b><br>D. 370, W. 262         | Ca <sub>3</sub> Al <sub>2</sub> (SiO <sub>4</sub> ) <sub>3</sub>   | Is         | 3.55          | 1.735        |
| <b>Grothite</b><br>W. 351, DAp. 3             | Ca, Al, Si, O, H <sub>2</sub> O  | Or         | 3.10          | 1.55         |
| <b>Grunerite</b><br>D. 338, DL. 2 (1)         | H <sub>2</sub> Fe'' <sub>7</sub> (SiO <sub>3</sub> ) <sub>8</sub>  | Mc         | 3.55          | 1.717, 1.672 |
| <b>Gruenlingite</b><br>DL. 4 (1), DAp. 1      | Bi(Te, S)  | Hx ?       | 7.32          | Op           |
| <b>Guanajuatite</b><br>D. 30, DL. 4 (1)       | Bi <sub>2</sub> Se <sub>3</sub>  | Or         | 6.80          | Op           |
| <b>Guarinite</b><br>D. 512, W. 219            | = Hiortdalite  | —          | —             | —            |
| <b>Gudmundite</b><br>ZK. 68, AM. 13           | FeSbS  | Or         | ?             | Op           |
| <b>Guejarite</b><br>D. 110, DL. 4 (1)         | = Chalcostibite  | —          | —             | —            |

| <i>Name and Reference.</i>               | <i>Composition.</i>  | <i>Cr.</i> | <i>G.</i> | <i>N.</i>    |
|--|--|------------|-----------|--------------|
| <b>Guitermanite</b><br>D. 142, Dl. 4 (1) | (1) $\text{Pb}_3\text{As}_2\text{S}_6$<br>(2) Group name incl. Embrithite and Lillianite   | ?          | 5.95      | Op           |
| <b>Gummitte</b><br>D. 712, Dl. 4 (2)     | $(\text{Ca}, \text{Pb})\text{O} \cdot \text{SiO}_2 \cdot 3\text{UO}_3 \cdot 6\text{H}_2\text{O}$   | ?          | 4.8       | 1.61         |
| <b>Gymnite</b><br>W. 228, H. 2           | = Deweylite  | —          | —         | —            |
| <b>Gyrolite</b><br>D. 434, W. 226        | $\text{H}_2\text{Ca}_2(\text{SiO}_3)_3 \cdot \text{H}_2\text{O}$   | Hx         | 2.43      | 1.540, 1.525 |
| <b>Gypsum</b><br>D. 746, H. 1 (3)        | $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$  | Mc         | 2.30      | 1.530, 1.521 |
| <b>Hackmanite</b><br>W. 342, Dl. 2 (2)   | $3\text{NaAlSiO}_4 \cdot \text{Na}(\text{Cl}, \text{S})$   | Is         | 2.33      | 1.487        |
| <b>Hæmafibrte</b><br>D. 627, Dl. 3 (1)   | $\text{Mn}_3(\text{OH})_3\text{AsO}_4 \cdot \text{H}_2\text{O}$  | Or         | 3.60      | 1.93, 1.87   |
| <b>Hæmatite</b><br>D. 232, Dl. 3 (2)     | (1) $\text{Fe}_2\text{O}_3$<br>(2) Group name incl. Corundum, Geikielite, Ilmenite, Pyrophanite and Senaite                              | Hx         | 5.25      | 3.05*, 2.80  |
| <b>Hæmatolite</b><br>D. 581, Dl. 3 (1)   | $(\text{Mn}, \text{Mg})_4(\text{Al}, \text{Fe})(\text{OH})_8\text{AsO}_4$  | Hx         | 3.40      | 1.733, 1.714 |
| <b>Hæmatophanite</b><br>ZK. 68, AM. 13   | $\text{PbOHCl} \cdot 4\text{PbO} \cdot 2\text{Fe}_2\text{O}_3$   | Tt         | 7.70      | ?            |
| <b>Hæmatostibiite</b><br>Dl. 3 (1), MT   | = Manganostibiite ?  | —          | —         | —            |
| <b>Haidingerite</b><br>D. 616, Dl. 3 (1) | $\text{HCaAsO}_4 \cdot \text{H}_2\text{O}$   | Or         | 2.90      | 1.638, 1.590 |
| <b>Hainite</b><br>W. 219, MT             | Na, Ca, Ce, Zr, Si, O, F   | Tc ?       | 3.20      | 1.7          |
| <b>Halloysite</b><br>D. 493, W. 240      | $\text{H}_4\text{Al}_2\text{Si}_2\text{O}_9 \cdot 2\text{H}_2\text{O}$   | Am         | 2.20      | 1.47         |
| <b>Halotrichite</b><br>D. 769, W. 116    | $\text{Fe}''\text{Al}_2(\text{SO}_4)_4 \cdot 22\text{H}_2\text{O}$   | Mc         | 2.04      | 1.492, 1.487 |
| <b>Hambergite</b><br>D. 696, H. 1 (4)    | $\text{Be}_2(\text{OH})\text{BO}_3$  | Or         | 2.35      | 1.631, 1.559 |
| <b>Hamlinite</b><br>D. 548, Dl. 3 (1)    | (1) $\text{SrAl}_3(\text{OH})_5(\text{PO}_4)_2 \cdot \text{H}_2\text{O}$<br>(2) Group name incl. Goyazite, Gorceixite and Plumbogummitte | Hx         | 3.20      | 1.635, 1.625 |
| <b>Hammarite</b><br>MA. 2, AM. 10        | $\text{Cu}_2\text{Pb}_2\text{Bi}_4\text{S}_9$  | Mc         | ?         | Op           |
| <b>Hancockite</b><br>W. 358, DAp. 2      | $\text{HCa}(\text{Pb}, \text{Sr})(\text{Al}, \text{Fe})_3\text{Si}_3\text{O}_{13}$   | Mc         | 4.05      | 1.830, 1.788 |
| <b>Hanksite</b><br>D. 733, H. 1 (3)      | $9\text{Na}_2\text{SO}_4 \cdot 2\text{Na}_2\text{CO}_3 \cdot \text{KCl}$   | Hx         | 2.57      | 1.481, 1.461 |

\* AO.

## 34 A KEY TO MINERAL GROUPS, SPECIES AND VARIETIES

| <i>Name and Reference.</i>                 | <i>Composition.</i>                                      | <i>Cr.</i> | <i>G.</i> | <i>N.</i>         |
|--|--|------------|-----------|-------------------|
| <b>Hannayite</b><br>W. 148, Dl. 3 (1)      | $H_4(NH_4)_2Mg_3(PO_4)_4 \cdot 8H_2O$                    | Tc         | 1.89      | 1.575, 1.555      |
| <b>Hardystonite</b><br>W. 268, Dl. 2 (1)   | $Ca_2ZnSi_2O_7$  | Tt         | 3.40      | 1.669, 1.657      |
| <b>Harmotome</b><br>D. 442, W. 401         | $KBa_5Al_{11}Si_{29}O_{80} \cdot 25H_2O$                 | Mc         | 2.50      | 1.508, 1.503      |
| <b>Harstigit</b><br>D. 412, W. 351         | $H_8Ca_{10}Mn_5Al_4Si_{12}O_{49}$                        | Or         | 3.05      | 1.683, 1.678      |
| <b>Hastingsite</b><br>Dap. 1, MA. 2        | Calcareous var. of Glaucophane                           | —          | —         | —                 |
| <b>Hatchettolite</b><br>D. 521, W. 159     | $UO_3 \cdot 3CaO \cdot 4Nb_2O_5 + H_2O$                  | Is         | 4.8       | 1.98              |
| <b>Hauerite</b><br>D. 86, Dl. 4 (1)        | $MnS_2$  | Is         | 3.8 ?     | 2.69              |
| <b>Hausmannite</b><br>D. 243, H. 1 (3)     | $Mn_3O_4$  | Tt         | 4.80      | AO, 2.46,<br>2.15 |
| <b>Hautefeullite</b><br>W. 125, Dl. 3 (1)  | Calcareous var. of Bobierrite                            | Mc         | 2.45      | 1.54, 1.51        |
| <b>Hauyne (Hauynite)</b><br>D. 363, W. 342 | $3NaAlSiO_4 \cdot CaSO_4$                                | Is         | 2.45      | 1.50              |
| <b>Hedenbergite</b><br>D. 325, W. 183      | $CaFe(SiO_3)_2$  | Mc         | 3.55      | 1.757, 1.739      |
| <b>Hedyphane</b><br>W. 131, H. 1 (4)       | Calcareous var. of Mimetite                              | Hx         | 5.80,     | 1.958, 1.948      |
| <b>Heintzéite</b><br>D. 706, MT.           | = Kaliborite   | —          | —         | —                 |
| <b>Heliophyllite</b><br>W. 154, Dl. 3 (1)  | = Ecdemite   | —          | —         | —                 |
| <b>Hellandite</b><br>D. 253, W. 253        | $Ca(Al, Y, Fe)_3(OH)_3(SiO_4)_2$                         | Mc         | 3.50      | 1.65              |
| <b>Helvite</b><br>D. 366, W. 220           | $Mn''_4Be_3S(SiO_4)_3$                                   | Is         | 3.25      | 1.739             |
| <b>Hemimorphite</b><br>D. 423, W. 221      | $Zn_2SiO_4 \cdot H_2O$                                   | Or         | 3.45      | 1.636, 1.614      |
| <b>Hengleinite</b><br>Dl. 4 (1), MM. 21    | $(Fe, Ni, Co)S_2$  | Is         | 4.70      | Op                |
| <b>Heptaphyllite</b><br>W. 361, MA. 3      | Sub group of Micas, incl. Lepidolite,<br>Muscovite, etc. | —          | —         | —                 |
| <b>Hercynite</b><br>D. 235, H. 1 (4)       | $FeAl_2O_4$  | Is         | 4.0       | 1.80              |
| <b>Herderite</b><br>D. 547, W. 133         | $CaBeFPO_4$  | Mc         | 3.00      | 1.621, 1.592      |
| <b>Herregrundite</b><br>D. 780, H. 1 (3)   | $(Cu, Ca)_5(OH)_6(SO_4)_2 \cdot 3H_2O$                   | Mc         | 3.15      | 1.660, 1.585      |
| <b>Hessonite</b><br>MT., D. 370            | = Grossularite or Ferriferous var.<br>of Grossularite    | —          | —         | —                 |

A KEY TO MINERAL GROUPS, SPECIES AND VARIETIES 35

| <i>Name and Reference.</i>               | <i>Composition.</i>   | <i>Cr.</i> | <i>G.</i> | <i>N.</i>    |
|--|---|------------|-----------|--------------|
| <b>Hessite</b><br>D. 43, Dl. 4 (1)       | $\text{Ag}_2\text{Te}$  | Is         | 8.5       | Op           |
| <b>Hetaerolite</b><br>AM. 13, MT.        | $\text{ZnMn}_2\text{O}_4$   | Tt         | 4.85      | 2.35, 2.10   |
| <b>Heterogenite</b><br>Dl. 3 (2), MA. 1  | $\text{CoO} \cdot 2\text{Co}_2\text{O}_3 \cdot 6\text{H}_2\text{O}$                   | Am         | 3.45      | AO           |
| <b>Heteromorphite</b><br>Dl. 4 (1), MT.  | $7\text{PbS} \cdot 4\text{Sb}_2\text{S}_3$  | Mc         | 5.70      | Op           |
| <b>Heterosite</b><br>Dl. 3 (1), AM. 12   | $2\text{Fe}'''\text{PO}_4 \cdot \text{H}_2\text{O}$                                   | Mc ?       | 3.40      | 1.91, 1.85   |
| <b>Heulandite</b><br>D. 438, W. 403      | $\text{H}_4\text{CaAl}_2(\text{SiO}_3)_6 \cdot 3\text{H}_2\text{O}$                   | Mc         | 2.20      | 1.503, 1.496 |
| <b>Hewettite</b><br>DAp. 3, Dl. 3 (1)    | $\text{H}_2\text{CaV}_6\text{O}_{17} \cdot 8\text{H}_2\text{O}$                       | Or ?       | 2.55      | 2.37, 1.77   |
| <b>Hexahydrate</b><br>DAp. 3, H. 1 (3)   | $\text{MgSO}_4 \cdot 6\text{H}_2\text{O}$   | Mc         | 1.76      | ?            |
| <b>Hibschite</b><br>W. 342, DAp. 2       | $\text{H}_4\text{CaAl}_2\text{Si}_2\text{O}_{10}$                                     | Is         | 3.05      | 1.67         |
| <b>Hiddenite</b><br>Dl. (2) 2, W. 194    | Green Spodumene of gem quality  | —          | —         | —            |
| <b>Hielmite</b><br>D. 531, Dl. 3 (1)     | H, Fe, Mn, Ca, Y, U <sup>4</sup> , Ta, Nb, O, Or<br>$\text{H}_2\text{O}$              |            | 5.70      | ?            |
| <b>Hieratite</b><br>D. 185, Dl. 4 (3)    | $\text{K}_2\text{SiF}_6$  | Is         | 2.70      | 1.340        |
| <b>Higginsite</b><br>W. 132, MA. 1       | $\text{CaCu}(\text{OH})\text{AsO}_4$  | Or         | 4.35      | 1.846, 1.800 |
| <b>Hillebrandite</b><br>W. 221, DAp. 2   | $\text{H}_2\text{Ca}_2\text{SiO}_5$   | Or         | 2.70      | 1.612, 1.605 |
| <b>Hinsdalite</b><br>DAp. 3, Dl. 3 (1)   | $\text{PbSO}_4 \cdot \text{AlPO}_4 \cdot 2\text{Al}(\text{OH})_3$                     | Hx ?       | 4.65      | 1.689, 1.670 |
| <b>Hintzeite</b><br>Dl. 3 (2)            | = Kaliborite  | —          | —         | —            |
| <b>Hiortdalite</b><br>D. 334, W. 219     | $\text{NaCa}_3\text{F}(\text{Si}, \text{Zr})_4\text{O}_{11}$                          | Tc         | 3.25      | 1.700, 1.688 |
| <b>Hisingerite</b><br>D. 506, MA. 2, 3   | $\text{H}_4\text{Fe}'''\text{Si}_2\text{O}_9 \cdot 2\text{H}_2\text{O}$               | Am         | 2.30      | 1.50         |
| <b>Hodgkinsonite</b><br>W. 225, MM. 17   | $\text{MnZn}_2(\text{OH})_2\text{SiO}_4$  | Mc         | 3.90      | 1.750, 1.715 |
| <b>Hoegbomite</b><br>W. 66, MM. 18       | $\text{Mg}(\text{Al}, \text{Fe})_4\text{O}_7 ?$                                       | Hx         | 3.80      | 1.850, 1.810 |
| <b>Hoernesite</b><br>D. 600, Dl. 3 (1)   | $\text{Mg}_3(\text{AsO}_4)_2 \cdot 8\text{H}_2\text{O}$                               | Mc         | 2.50      | 1.596, 1.563 |
| <b>Hokutolite</b><br>MT., Dl. 4 (2)      | Lead bearing var. of Barite   | Or         | 4.65      | 1.67         |
| <b>Holdenite</b><br>W. 135, AM. 12       | $8\text{MnO} \cdot 4\text{ZnO} \cdot \text{As}_2\text{O}_5 \cdot 5\text{H}_2\text{O}$ | Or         | 4.05      | 1.785, 1.769 |
| <b>Hollandite</b><br>Dl. 3 (2), H. 1 (3) | ? Mixt. of Psilomelane, Romanechite<br>and Limonite                                   | Tt *       | 4.8       | Op           |

\* Pseudomorphous after Polianite ?

| <i>Name and Reference.</i>                              | <i>Composition.</i>   | <i>Cr.</i> | <i>G.</i> | <i>N.</i>          |
|---|---|------------|-----------|--------------------|
| <b>Holmquistite</b><br>Dl. 2 (2), AM. 15                | Lithium bearing var. of Glaucophanes  | Mc         | 3.10      | 1.654, 1.625       |
| <b>Homilite</b><br>D. 402, W. 252                       | $\text{Ca}_2\text{Fe}''\text{B}_2\text{Si}_2\text{O}_{10}$  | Mc         | 3.35      | 1.738, 1.715       |
| <b>Hopeite</b><br>Dl. 3 (1), W. 124                     | $\text{Zn}_3(\text{PO}_4)_2 \cdot 4\text{H}_2\text{O}$  | Or         | 3.05      | 1.586, 1.574       |
| <b>Hornblende (Green)</b><br>D. 338, W. 212             | $\text{H}_2\text{Ca}_2(\text{Mg, Fe})_5\text{Si}_8\text{O}_{24} +$<br>$\text{H}_2(\text{Mg, Fe})_6\text{Al}_2\text{Si}_7\text{O}_{24}$        | Mc         | 3.15      | 1.663, 1.645       |
| <b>Hornblende (Brown Basaltic)</b><br>Dl. 2 (1), AM. 15 | $\text{Ca}_2(\text{Mg, Fe})_3\text{Fe}'''\text{Si}_8\text{O}_{24} +$<br>$(\text{Mg, Fe})_4\text{Fe}'''\text{Al}_2\text{Si}_7\text{O}_{24}(?)$ | Mc         | 3.25      | 1.725, 1.695       |
| <b>Horsfordite</b><br>D. 36, Dl. 4 (1)                  | $\text{Cu}_5\text{Sb}$  | ?          | 8.80      | Op                 |
| <b>Hortonolite</b><br>D. 376A, Dl. 2 (1)                | Manganiferous var. of Fayalite  | Or         | 4.0       | 1.803, 1.768       |
| <b>Howlite</b><br>D. 701, W. 97                         | $\text{H}_5\text{Ca}_2\text{B}_5\text{SiO}_{14}$  | Mc         | 2.60      | 1.605, 1.586       |
| <b>Huebnerite</b><br>D. 813, Dl. 4 (3)                  | $\text{MnWO}_4$   | Mc         | 7.30      | 2.30, 2.20 ;<br>AO |
| <b>Huegelite</b><br>W. 127, DAp. 3                      | $\text{Pb, Zn, VO}_4, \text{H}_2\text{O}$   | Mc         | 5.0       | 1.915              |
| <b>Hulsite</b><br>DAp. 3, MT.                           | $12\text{FeO} \cdot 2\text{Fe}_2\text{O}_3 \cdot \text{SnO}_2 \cdot$<br>$3\text{B}_2\text{O}_3 \cdot 2\text{H}_2\text{O}$                     | Or ?       | 4.30      | Op                 |
| <b>Humboldtine</b><br>D. 823, Dl. 4 (3)                 | $\text{Fe}''\text{C}_2\text{O}_4 \cdot 2\text{H}_2\text{O}$   | Or         | 2.28      | 1.692, 1.494       |
| <b>Humite</b><br>D. 414, W. 223                         | (1) $\text{Mg}_7(\text{F, OH})_2(\text{SiO}_4)_3$<br>(2) Group name incl. Clinohumite,<br>Chondrodite and Norbergite                          | Or<br>—    | 3.10<br>— | 1.652, 1.617<br>—  |
| <b>Hureaulite</b><br>D. 624, W. 123                     | $\text{H}_2\text{Mn}_5(\text{PO}_4)_4 \cdot 4\text{H}_2\text{O}$  | Mc         | 3.20      | 1.660, 1.647       |
| <b>Huronite</b><br>MA. 3, DAp. 1                        | Mixt. of Sericite, Zoisite and Albite   | —          | —         | —                  |
| <b>Hutchinsonite</b><br>Dl. 4 (1), MT                   | $(\text{Tl, Ag})_2\text{PbAs}_4\text{S}_8$  | Or         | 4.60      | Op                 |
| <b>Hyalite</b><br>D. 212, Dl. 2 (1)                     | Gum-like form of Opal   | —          | —         | —                  |
| <b>Hyalophane</b><br>W. 314, D. 314                     | Ba-bearing var. of Adularia :<br>$\text{KAlSi}_3\text{O}_8 + \text{BaAl}_2\text{Si}_2\text{O}_8$  | Mc         | 2.70      | 1.541, 1.535       |
| <b>Hyalosiderite</b><br>W. 166, Dl. 2 (1)               | = Olivine   | —          | —         | —                  |
| <b>Hyalotekite</b><br>D. 356, W. 251                    | $\text{Ca}_3\text{Ba}_3\text{Pb}_3\text{B}_2(\text{SiO}_3)_{12} \cdot \text{H}_2\text{O}$   | Or         | 3.80      | 1.966, 1.963       |
| <b>Hydrargillite</b><br>W. 48, Dl. 3 (2)                | = Gibbsite  | —          | —         | —                  |
| <b>Hydroboracite</b><br>D. 710, H. 1 (4)                | $\text{H}_{14}\text{CaMg}(\text{BO}_3)_6$   | Mc         | 2.00      | 1.565, 1.517       |

| <i>Name and Reference.</i>                 | <i>Composition.</i>   | <i>Cr.</i> | <i>G.</i> | <i>N.</i>         |
|--|---|------------|-----------|-------------------|
| <b>Hydrocerussite</b><br>D. 292, H. 1 (3)  | $Pb_3(OH)_2(CO_3)_2$  | Hx         | 6.15      | 2.09, 1.94        |
| <b>Hydrocyanite</b><br>D. 724, H. 1 (3)    | $CuSO_4$  | Or         | 3.6       | ?                 |
| <b>Hydrogiobertite</b><br>D. 301, H. 1 (3) | = Hydromagnesite  | —          | —         | —                 |
| <b>Hydrohæmatite</b><br>W. 45, DL. 3 (2)   | $2Fe_2O_3 \cdot H_2O$ ; = Turgite, perhaps a mixture of Goethite and Hæmatite                     | Hx ?       | 4.5+      | 2.6, 2.4          |
| <b>Hydroherderite</b><br>H. 1 (4), DAp. 1  | $CaBe(OH)PO_4$  | Mc         | 2.95      | ?                 |
| <b>Hydromagnesite</b><br>D. 300, H. 1 (3)  | $Mg_3(OH)_2(CO_3)_2 \cdot 3H_2O$  | Mc         | 2.16      | 1.542, 1.524      |
| <b>Hydromica</b><br>W. 363, D. 458         | = Damourite   | —          | —         | —                 |
| <b>Hydronephelite</b><br>D. 457, MT.       | Mixt. of Natrolite, etc.  | —          | —         | —                 |
| <b>Hydrophilite</b><br>D. 174, DL. 4 (3)   | $CaCl_2$  | Is         | 2.20      | 1.613, 1.600      |
| <b>Hydrorhodonite</b><br>W. 196, MT.       | Hydrated Rhodonite, not specific  | —          | —         | —                 |
| <b>Hydrotalcite</b><br>D. 266, W. 89       | (1) $6MgO \cdot Al_2O_3 \cdot CO_2 \cdot 12H_2O$<br>(2) Group name incl. Pyroaurite and Stichtite | Hx<br>—    | 2.05<br>— | 1.512, 1.498<br>— |
| <b>Hydrothorite</b><br>MA. 3, AM. 13       | $TbSiO_4 \cdot 4H_2O$   | Am         | ?         | 1.638             |
| <b>Hydrozincite</b><br>D. 291, H. 1 (3)    | $Zn_3(OH)_2(CO_3)_2$  | ?          | 3.6       | 1.74, 1.65        |
| <b>Hypersthene</b><br>D. 324, W. 178       | Ferruginous var. of Enstatite   | Or         | 3.4       | 1.71, 1.695       |
| <b>Ianthinite</b><br>MA. 3, DL. 4 (2)      | $2UO_2 \cdot 7H_2O$   | Or         | ?         | 1.920, 1.674      |
| <b>Ice</b><br>D. 223, W. 40                | $H_2O$  | Hx         | 0.92      | 1.313, 1.309      |
| <b>Iceland-spar</b><br>D. 270, H. 1 (3)    | = Transparent Calcite   | —          | —         | —                 |
| <b>Iddingsite</b><br>W. 383, MA. 3         | $H_2MgFe_2Si_3O_{14} ?$   | Or         | 2.7       | 1.75, 1.71        |
| <b>Idocrase</b><br>D. 393, W. 344          | = Vesuvianite   | —          | —         | —                 |
| <b>Ihleite</b><br>D. 774, Ls.              | = Copiapite   | —          | —         | —                 |
| <b>Ilesite</b><br>D. 747, H. 1 (3)         | $(Mn, Zn)SO_4 \cdot 4H_2O$ (or $5H_2O$ )  | Mc         | ?         | ?                 |
| <b>Ilmenite</b><br>D. 233, DL. 3 (1)       | $FeTiO_3 (+ Fe_2O_3)$   | Hx         | 4.65      | Op                |



## 38 A KEY TO MINERAL GROUPS, SPECIES AND VARIETIES

| <i>Name and Reference.</i>                    | <i>Composition.</i>   | <i>Cr.</i> | <i>G.</i>     | <i>N.</i>    |
|---|---|------------|---------------|--------------|
| <b>Ilmenorutile</b><br>Dl. 3 (1), MM. 18      | $\text{FeNb}_2\text{O}_6 + \text{Ti}_3\text{O}_6$   | Tt         | 4.3-<br>6.1   | Op           |
| <b>Ilsemannite</b><br>Dl. 4 (2), H. 1 (3)     | $\text{Mo}_3\text{O}_8 \cdot 5\text{H}_2\text{O}$   | Am         | ?             | ?            |
| <b>Ilvaite</b><br>D. 417, W. 351              | $\text{HCaFe}''_2\text{Fe}'''_2\text{Si}_2\text{O}_9$   | Or         | 3.9           | 1.9 AO.      |
| <b>Imerinite</b><br>W. 209, Dl. 2 (1)         | $\text{H}_2\text{Na}_2\text{Mg}_3\text{Fe}'''_2(\text{SiO}_3)_8 + \text{H}_2\text{Mg}_7$<br>( $\text{SiO}_3$ ) <sub>8</sub> = var. of Rhodusite | Mc         | 3.0           | 1.653, 1.638 |
| <b>Indianaite</b><br>W. 240, MT.              | Mixt. of Halloysite, Sericite, etc.   | —          | —             | —            |
| <b>Inesite</b><br>D. 431, Dl. 2 (1)           | $3(\text{Mn, Ca})\text{SiO}_3 \cdot 2\text{H}_2\text{O}$  | Tc         | 3.00          | 1.644, 1.613 |
| <b>Inyoite</b><br>W. 94, H. 1 (4)             | $\text{Ca}_2\text{B}_6\text{O}_{11} \cdot 13\text{H}_2\text{O}$   | Mc         | 1.88          | 1.520, 1.495 |
| <b>Iodembolite</b><br>W. 30, Dl. 4 (3)        | = Iodobromite   | —          | —             | —            |
| <b>Iodobromite</b><br>D. 172, Dl. 4 (3)       | $\text{Ag}(\text{Cl, Br, I})$   | Is         | 6.2           | 2.20         |
| <b>Iodyrite</b><br>D. 173, Dl. 4 (3)          | $\text{AgI}$  | Hx         | 5.65          | 2.22, 2.21   |
| <b>Iolite</b><br>D. 353, W. 273               | = Cordierite  | —          | —             | —            |
| <b>Iozite</b><br>MT., MA. 2                   | $\text{FeO}$  | ?          | ?             | Op           |
| <b>Iridosmine</b><br>D. 22, H. 1              | = Osmiridium  | —          | —             | —            |
| <b>Iron (meteoric)</b><br>H. 1, Dl. 3 (2)     | = Kamacite and Taenite  | —          | —             | —            |
| <b>Iron (terrestrial)</b><br>D. 25, Dl. 3 (2) | $\text{Fe}$   | Is         | 7.80          | Op           |
| <b>Iron-beidellite</b><br>MA. 3, AM. 11       | Ferriferous var. of Beidellite  | ?          | ?             | ?            |
| <b>Ishikawaite</b><br>AM. 7, MA. 2            | $\text{Fe}''$ , $\text{U}^4$ , Ce, Y, Nb, O   | ?          | 6.3           | Op           |
| <b>Isoclasite</b><br>D. 626, W. 136           | $\text{Ca}_2(\text{OH})\text{PO}_4 \cdot 2\text{H}_2\text{O}$   | Mc         | 2.90          | 1.580, 1.565 |
| <b>Isomicrocline</b><br>W. 323                | Optical variant of Microcline   | —          | —             | —            |
| <b>Isorthoclase</b><br>W. 322, DAp. 2         | Optical variant of Orthoclase   | —          | —             | —            |
| <b>Ivaarite</b><br>W. 266, DAp. 2             | = Schorlomite   | —          | —             | —            |
| <b>Ixiolite</b><br>D. 527, H. 1 (4)           | $\text{MnTa}_3\text{O}_8$   | Tt         | 6.55-<br>7.90 | ?            |
| <b>Jacksonite</b><br>W. 394, D. 411           | = Thomsonite  | —          | —             | —            |
| <b>Jacobsite</b><br>D. 240, H. 1 (4)          | $\text{MnFe}_2\text{O}_4$   | Is         | 4.75          | Op or AO     |

A KEY TO MINERAL GROUPS, SPECIES AND VARIETIES 39

| <i>Name and Reference.</i>               | <i>Composition.</i>  | <i>Cr.</i>  | <i>G.</i> | <i>N.</i>    |
|--|--|-------------|-----------|--------------|
| <b>Jade</b><br>D. 328, etc., BPS.        | Trade name for gem var. of Jadeite,<br>Nephrite, etc.  | —           | —         | —            |
| <b>Jadeite</b><br>D. 328, W. 193         | $\text{NaAl}(\text{SiO}_3)_2(+\text{CaMgSi}_2\text{O}_6)$  | Mc          | 3.4       | 1.676, 1.658 |
| <b>Jaipurite</b><br>Dl. 4 (1), MT.       | $\text{CoS}$   | Is          | 5.45      | Op           |
| <b>Jalpaite</b><br>D. 42A, Dl. 4 (1)     | $\text{Ag}_3\text{CuS}_2$  | Is ?        | 6.85      | Op           |
| <b>Jamesonite</b><br>D. 130, Dl. 4 (1)   | (1) $\text{Pb}_4\text{FeSb}_6\text{S}_{14}$<br>(2) Group name incl. Franckeite<br>and Wittite              | Or or<br>Mc | 5.65      | Op           |
| <b>Janosite</b><br>H. 1 (3), Ls. 62      | = Copiapite  | —           | —         | —            |
| <b>Jarosite</b><br>W. 114, H. 1 (3)      | $\text{KFe}'''\text{}_3(\text{OH})_6(\text{SO}_4)_2$   | Hx          | 3.20      | 1.820, 1.715 |
| <b>Jasper</b><br>D. 210, BPS.            | Mixt. of Chalcedony and Hæmatite   | —           | —         | —            |
| <b>Jefferisite</b><br>D. 480, W. 371     | Mg, Al, $\text{SiO}_3$ , $\text{H}_2\text{O}$  | Mc ?        | 2.4       | 1.585, 1.565 |
| <b>Jeffersonite</b><br>W. 185, Dl. 2 (1) | Mn. and Zn bearing var. of Diopside  | Mc          | 3.40      | 1.748, 1.720 |
| <b>Jenkinsite</b><br>W. 376, MT.         | Ferruginous var. of Antigorite   | —           | —         | —            |
| <b>Jeremejevite</b><br>MT.               | = Eremeyevite  | —           | —         | —            |
| <b>Jeromite</b><br>MM. 21, AM. 13        | $\text{As}(\text{S}, \text{Se})_2$ . Semi-artificial   | Am          | ?         | ?            |
| <b>Jezekite</b><br>W. 154, Dl. 3 (1)     | $\text{Na}_4\text{CaAl}_2\text{O}(\text{F} \cdot \text{OH})_4(\text{PO}_4)_2$                              | Mc          | 2.95      | 1.59, 1.54   |
| <b>Johannite</b><br>D. 806, H. 1 (3)     | $\text{CuO} \cdot 3\text{UO}_3 \cdot 3\text{SO}_3 \cdot 4\text{H}_2\text{O}$                               | Tc          | 3.20      | 1.614, 1.572 |
| <b>Johnstrupite</b><br>D. 515, W. 251    | $\text{Na}_2\text{Ca}_3\text{CeF}_3(\text{Ti}, \text{Zr})\text{Si}_5\text{O}_{16}$                         | Mc          | 3.30      | 1.673, 1.661 |
| <b>Jordanite</b><br>D. 150, Dl. 4 (1)    | (1) $\text{Pb}_4\text{As}_2\text{S}_7$<br>(2) Group name incl. Goongarrite<br>and Meneghinite              | Or          | 5.9       | Op           |
| <b>Jordisite</b><br>MM. 15               | $\text{MoS}_2$   | Am.         | ?         | Op           |
| <b>Joséite</b><br>D. 32, Dl. 4 (1)       | $\text{Bi}_3(\text{Te}, \text{S})_2$   | Hx ?        | 7.75      | Op           |
| <b>Julienite</b><br>MM. 21, AM. 14       | $2\text{CoCl}_2 \cdot \text{Co}(\text{NO}_3)_2 \cdot 15\text{Co}(\text{OH}_2)_2 \cdot 4\text{H}_2\text{O}$ | Hx          | ?         | 1.645, 1.556 |
| <b>Jurupaite</b><br>W. 231, MA. 1        | $\text{H}_2\text{Ca}_2\text{Si}_2\text{O}_7$   | Mc          | 2.75      | 1.576, 1.568 |

| <i>Name and Reference.</i>               | <i>Composition.</i>   | <i>Cr.</i> | <i>G.</i> | <i>N.</i>    |
|--|---|------------|-----------|--------------|
| <b>Justite</b><br>Dl. 4 (3), DAp. 2      | = Koenenite   | —          | —         | —            |
| <b>Kaemmererite</b><br>D. 468, W. 382    | Chromiferous var. of Clinochlore  | Mc         | 2.85      | 1.590, 1.587 |
| <b>Kaersutite</b><br>W. 212, Dl. 2 (1)   | Titaniferous var. of Hornblende   | —          | —         | —            |
| <b>Kainite</b><br>D. 730, H. 1 (3)       | $\text{KMgClSO}_4 \cdot 3\text{H}_2\text{O}$  | Mc         | 2.13      | 1.520, 1.495 |
| <b>Kainosite</b><br>W. 406, AM. 15       | = Cenosite  | —          | —         | —            |
| <b>Kaliborite</b><br>H. 1 (4), W. 95     | $\text{KMg}_2\text{B}_{11}\text{O}_{19} \cdot 9\text{H}_2\text{O}$  | Mc         | 2.13      | 1.550, 1.508 |
| <b>Kalinite</b><br>H. 1 (3), W. 114      | $\text{KAl}(\text{SO}_4)_2 \cdot 12\text{H}_2\text{O}$ .<br>Cf. Potassalumite *                                     | Mc         | 1.75      | 1.458, 1.430 |
| <b>Kaliophilite</b><br>D. 359, W. 270    | $\text{KAlSiO}_4$   | Hx         | 2.55      | 1.534, 1.529 |
| <b>Kamacite</b><br>H. 1, Dl. 3 (2)       | $\text{Fe}_{13}(\text{Ni, Co})$ to $\text{Fe}_{21}(\text{Ni, Co})$ †  | Is         | 7.8       | Op           |
| <b>Kamarezite</b><br>Dl. 4 (2), H. 1 (3) | $\text{Cu}_3(\text{OH})_4\text{SO}_4 \cdot 6\text{H}_2\text{O}$   | Or         | 4.00      | ?            |
| <b>Kaolinite</b><br>D. 492, Dl. 2 (2) ‡  | $\text{H}_4\text{Al}_2\text{Si}_2\text{O}_9$  | Mc         | 2.59      | 1.566, 1.561 |
| <b>Karelinite</b><br>Dl. 4 (1), MT       | $\text{Bi}_4\text{O}_3\text{S}$   | ?          | 6.60      | Op           |
| <b>Karyinite</b><br>Dl. 3 (1)            | = Caryinite   | —          | —         | —            |
| <b>Kasolite</b><br>MA. 3, BSF. 49        | $3\text{PbUSiO}_6 \cdot 4\text{H}_2\text{O}$  | Mc         | 5.96      | 1.90         |
| <b>Kataphorite</b><br>W. 216, Dl. 2 (1)  | Var. of Arfvedsonite  | —          | —         | —            |
| <b>Katoprite</b><br>W. 407, MA. 1        | $14(\text{Mn, Mg})\text{O} \cdot 2(\text{Al, Fe})_2\text{O}_3 \cdot$<br>$\text{Sb}_2\text{O}_5 \cdot 2\text{SiO}_2$ | Mc         | 4.5       | 1.9          |
| <b>Kehoeite</b><br>W. 154, Dl. 3 (1)     | $3(\text{Zn, Ca})\text{O} \cdot 2\text{Al}_2\text{O}_3 \cdot \text{P}_2\text{O}_5 \cdot 27\text{H}_2\text{O}$       | Am         | 2.34      | 1.53         |
| <b>Keilhauite</b><br>D. 511, W. 219      | Y and Fe-bearing var. of Titanite,<br>$\text{CaTiSiO}_5 + (\text{Fe, Y})_2\text{SiO}_5$                             | Mc         | 3.55      | 2.03, 1.92   |
| <b>Kelyphite</b><br>W. 263, D. 370       | Mixt. of Actinolite, etc.   | —          | —         | —            |
| <b>Kempite</b><br>W. 38, Dl. 4 (3)       | $\text{Mn}_4\text{O}_6\text{Cl}_2 \cdot 3\text{H}_2\text{O}$  | Or         | 2.94      | 1.698, 1.684 |
| <b>Kentrolite</b><br>D. 420, W. 276      | $\text{Pb}_2\text{Mn}'''\text{Si}_2\text{O}_9$  | Or         | 6.20      | 2.31 2.10    |
| <b>Kermesite</b><br>D. 107, Dl. 4 (1)    | $\text{Sb}_2\text{S}_2\text{O}$   | Mc         | 4.55      | 2.72         |

\* Hintze's Kalinite = Winchell's Potassalumite.

† A. Brezina, Meteoritenstudien 111.

‡ See also *Jour. Amer. Ceramic Soc.* XIII (1929), p. 155.

| <i>Name and Reference.</i>                | <i>Composition.</i>  | <i>Cr.</i> | <i>G.</i> | <i>N.</i>    |
|---|--|------------|-----------|--------------|
| <b>Kernite</b><br>AM. 12, W. 92           | $\text{Na}_2\text{B}_4\text{O}_7 \cdot 4\text{H}_2\text{O}$  | Or         | 1.95      | 1.488, 1.454 |
| <b>Keweenawite</b><br>MA. 3, DAp. 2       | Mixt. of Domeykite, Niccolite, etc.  | —          | —         | —            |
| <b>Kieserite</b><br>D. 744, H. 1 (3)      | $\text{MgSO}_4 \cdot \text{H}_2\text{O}$   | Mc         | 2.56      | 1.586, 1.523 |
| <b>Kilbrickenite</b><br>D. 154, DL. 4 (1) | = Geocronite   | —          | —         | —            |
| <b>Kipushite</b><br>AM. 13, MA. 3         | = Arakawite  | —          | —         | —            |
| <b>Klaprotholite</b><br>DL. 4 (1), D. 124 | (1) $\text{Cu}_6\text{Bi}_4\text{S}_9$<br>(2) Group name incl. Hammarite,<br>Rathite and Schirmerite | Or         | 4.6       | Op           |
| <b>Kleibergite</b><br>AM. 15, MA. 4       | $\text{Sb}, \text{SO}_4, \text{H}_2\text{O}$   | Mc         | ?         | 1.74 +       |
| <b>Kleinite</b><br>W. 37, DL. 4 (3)       | $\text{Hg}_4\text{O}_3\text{Cl}_2$   | Hx         | 7.95      | 2.21, 2.19   |
| <b>Klipsteinite</b><br>W. 196, MT.        | Hydrated Rhodonite, probably<br>mixture  | —          | —         | —            |
| <b>Klockmannite</b><br>MM. 21, AM. 14     | $\text{CuSe}$  | Hx ?       | ?         | ?            |
| <b>Knebelite</b><br>D. 378, W. 171        | Manganiferous var. of Fayalite   | Or         | 4.1       | 1.845, 1.800 |
| <b>Knopite</b><br>W. 158, DL. 3 (1)       | Cerium-bearing var. of Perovskite  | Is ?       | 4.25      | 2.30         |
| <b>Knoxvillite</b><br>D. 785, H. 1 (3)    | Chromiferous var. of Copiapite   | Or         | ?         | 1.576, 1.507 |
| <b>Kobellite</b><br>D. 131, DL. 4 (1)     | Antimonial var. of Cosalite  | —          | —         | —            |
| <b>Kochite</b><br>W. 238, MA. 2           | $\text{Al}_4(\text{SiO}_4)_3 \cdot 5\text{H}_2\text{O}$  | Is         | 2.93      | 1.59         |
| <b>Koehlinite</b><br>W. 108, DL. 4 (3)    | $\text{Bi}_2\text{O}_2\text{MoO}_4$  | Or         | ?         | 2.6, 2.5     |
| <b>Koenenite</b><br>W. 37, DL. 4 (3)      | $\text{Mg}_5\text{Al}_2\text{O}_6\text{Cl}_4 \cdot 8\text{H}_2\text{O}$                              | Hx         | 1.98      | ?            |
| <b>Koettigite</b><br>D. 604, DL. 3 (1)    | $\text{Zn}_3(\text{AsO}_4)_2 \cdot 8\text{H}_2\text{O}$  | Mc         | 3.10      | 1.717, 1.662 |
| <b>Kolovratite</b><br>MM. 20, AM. 11      | $\text{Ni}, \text{VO}_4$   | ?          | ?         | ?            |
| <b>Koninckite</b><br>D. 614, DL. 3 (1)    | $\text{Fe}'''\text{PO}_4 \cdot 3\text{H}_2\text{O}$  | Or         | 2.4       | 1.656, 1.645 |
| <b>Koppite</b><br>D. 520A., W. 159        | = Pyrochlore   | Is         | 4.5       | 2.15         |
| <b>Kornerupite</b><br>W. 249, DL. 2 (2)   | $\text{H}_2\text{Mg}_7(\text{Al}, \text{B})_{12}\text{Si}_7\text{O}_{40}$ *                          | Or         | 3.25      | 1.675, 1.663 |
| <b>Kossmatite</b><br>W. 384, MA. 2        | $\text{H}_{15}\text{Ca}_7\text{Mg}_3\text{Al}_6\text{FSi}_7\text{O}_{42}$                            | Tc ?       | ?         | 1.564        |

\* Al : B about 7 to 1.

## 42 A KEY TO MINERAL GROUPS, SPECIES AND VARIETIES

| <i>Name and Reference.</i>                 | <i>Composition.</i>  | <i>Cr.</i> | <i>G.</i> | <i>N.</i>    |
|--|--|------------|-----------|--------------|
| <b>Kramerite</b><br>MA. 4, AM. 15          | = Probertite   | —          | —         | —            |
| <b>Kraurite</b><br>W. 140, MA. 2           | Optical var. of Dufrenite  | Mc         | 3.3       | 1.890, 1.840 |
| <b>Kreitonite</b><br>D. 236, H. 1 (4)      | Ferruginous var. of Gahnite  | —          | —         | —            |
| <b>Kremersite</b><br>D. 198, Dl. 4 (3)     | $\text{KNH}_4\text{Fe}'''\text{Cl}_5 \cdot \text{H}_2\text{O}$                           | Is         | ?         | ?            |
| <b>Krennerite</b><br>D. 105, Dl. 4 (1)     | $\text{AuTe}_2$  | Or         | 8.35      | Op           |
| <b>Kreuzbergite</b><br>W. 139, ZK. 55      | $\text{Al, PO}_4, \text{H}_2\text{O}$  | Or         | 2.14      | 1.63, 1.61   |
| <b>Kroehnkite</b><br>D. 776, H. 1 (3)      | $\text{Na}_2\text{Cu}(\text{SO}_4)_2 \cdot 2\text{H}_2\text{O}$                          | Mc         | 2.06      | 1.601, 1.544 |
| <b>Kryptotilite</b><br>W. 370, JWAS. 7     | Probably = Leverrierite  | —          | —         | —            |
| <b>Ktypeite</b><br>LF. 3, H. 1 (3)         | = Aragonite  | —          | —         | —            |
| <b>Kunzite</b><br>W. 194, Dl. 2 (2)        | Lilac Spodumene of gem quality   | —          | —         | —            |
| <b>Kupfferite</b><br>W. 202, 205, H. 2     | $\text{H}_2\text{Mg}_7(\text{SiO}_2)_8$  | Mc         | 3.10      | 1.600, 1.585 |
| <b>Kyanite (Cyanite)</b><br>D. 400, W. 236 | $\text{Al}_2\text{SiO}_5$  | Tc         | 3.60      | 1.728, 1.713 |
| <b>Laavenite</b><br>W. 245, D. 332         | = Lovenite   | —          | —         | —            |
| <b>Labradorite</b><br>D. 319, W. 335       | Sodium-bearing var. of Anorthite<br>$\text{Ab}_5\text{An}_5$ to $\text{Ab}_3\text{An}_7$ | Tc         | 2.70      | 1.568, 1.559 |
| <b>Lacroixite</b><br>W. 154, Dl. 3 (1)     | $\text{Na}_4\text{Ca}_4\text{Al}_3\text{O}_2(\text{F, OH})_5(\text{PO}_4)_3$             | Or ?       | 3.15      | 1.57         |
| <b>Lagonite</b><br>D. 702, USPP. 158       | Mixt. of Sassolite and Limonite  | —          | —         | —            |
| <b>Lamprophyllite</b><br>W. 243, MA. 3     | $\text{Na, Sr, Ba, Si, Ti, Zr, O}$   | ?          | ?         | 1.77, 1.73   |
| <b>Lanarkite</b><br>D. 737, H. 1 (3)       | $\text{Pb}_2\text{OSO}_4$  | Mc         | 6.8       | 2.01, 1.93   |
| <b>Landesite</b><br>AM. 15, MA. 4          | $\text{Mn}''_{10}\text{Fe}'''_3(\text{OH})_6(\text{PO}_4)_8 \cdot 11\text{H}_2\text{O}$  | ?          | 3.03      | 1.735, 1.720 |
| <b>Langbanite</b><br>W. 67, DAp. 1         | = Longbanite   | —          | —         | —            |
| <b>Langbeinite</b><br>W. 111, H. 1 (3)     | $\text{K}_2\text{Mg}_2(\text{SO}_4)_3$   | Is         | 2.85      | 1.534        |
| <b>Langite</b><br>H. 1 (3), AJS. 1929      | Mixt. of Antlerite, etc.   | —          | —         | —            |
| <b>Lansfordite</b><br>D. 302, H. 1 (3)     | $\text{MgCO}_3 \cdot 5\text{H}_2\text{O}$  | Mc         | 1.71      | 1.502, 1.456 |
| <b>Lanthanite</b><br>D. 298, H. 1 (3)      | $\text{La}_2(\text{CO}_3)_3 \cdot 8\text{H}_2\text{O}$                                   | Or         | 2.70      | 1.613, 1.520 |

| <i>Name and Reference.</i>              | <i>Composition.</i>   | <i>Cr.</i>  | <i>G.</i> | <i>N.</i>    |
|---|---|-------------|-----------|--------------|
| <b>Larderellite</b><br>D. 703, H. 1 (4) | $(\text{NH}_4)_2\text{B}_{10}\text{O}_{16} \cdot 5\text{H}_2\text{O}$   | Mc          | ?         | 1.561, 1.509 |
| <b>Larnite</b><br>MM. 22, AM. 14        | $\text{Ca}_2\text{SiO}_4$   | Mc          | ?         | 1.730, 1.707 |
| <b>Larsenite</b><br>AM. 13, MA. 3       | $\text{PbZnSiO}_4$  | Or          | 5.90      | 1.96, 1.92   |
| <b>Latrobite</b><br>DL. 2 (2), MT.      | Potassic. var. of Anorthite   | —           | —         | —            |
| <b>Laubanite</b><br>D. 446, W. 405      | $\text{Ca}_2\text{Al}_2(\text{SiO}_3)_5 \cdot 6\text{H}_2\text{O}$  | Mc ?        | 2.20      | 1.486, 1.475 |
| <b>Laumontite</b><br>W. 397, DL. 2 (3)  | $\text{Ca}_7\text{Al}_{14}\text{Si}_{26}\text{O}_{80} \cdot 25\text{H}_2\text{O} +$<br>$\text{Na}_2\text{Ca}_5\text{Al}_{12}\text{Si}_{28}\text{O}_{80} \cdot 25\text{H}_2\text{O}$ | Mc          | 2.32      | 1.521, 1.509 |
| <b>Laurionite</b><br>D. 189, DL. 4 (3)  | $\text{Pb}(\text{OH})\text{Cl}$   | Or          | 6.25      | 2.158, 2.077 |
| <b>Laurite</b><br>D. 94, DL. 4 (1)      | $\text{RuS}_2$  | Is          | 7.00      | Op           |
| <b>Lautarite</b><br>W. 90, DL. 4 (3)    | $\text{Ca}(\text{IO}_3)_2$  | Mc          | 4.60      | 1.888, 1.792 |
| <b>Lautite</b><br>DAp. 3, MT.           | $\text{CuAsS}$  | Or          | 4.90      | Op           |
| <b>Lavendulan</b><br>W. 126, DL. 3 (1)  | Cupriferous var. of Erythrite, or<br>cobaltiferous var. of Trichalcite  | Mc          | 3.00      | 1.715        |
| <b>Lawrencite</b><br>D. 178, DL. 4 (3)  | $\text{FeCl}_2$   | Hx          | 2.99      | 1.57         |
| <b>Lawsonite</b><br>W. 348, DL. 2 (2)   | $\text{H}_4\text{CaAl}_7\text{Si}_2\text{O}_{10}$   | Or          | 3.10      | 1.684, 1.665 |
| <b>Laxmannite</b><br>MT., D. 727        | = Vauquelinite  | —           | —         | —            |
| <b>Lazulite</b><br>D. 574, D. 3 (1)     | $(\text{Mg}, \text{Fe})\text{Al}_2(\text{OH})_2(\text{PO}_4)_2$   | Mc          | 3.05      | 1.639, 1.603 |
| <b>Lazurapatite</b><br>D. 549           | = Manganapatite   | —           | —         | —            |
| <b>Lazurite</b><br>D. 365, W. 342       | $n\text{NaAlSiO}_4 \cdot m\text{Ca}_2\text{SiO}_4 +$<br>$(\text{Na}_2\text{SO}_4, \text{NaCl}, \text{NaS}_2) ?$   | Is          | 2.42      | 1.50         |
| <b>Lead</b><br>D. 18, H. 1              | Pb  | Is          | 11.35     | Op           |
| <b>Leadhillite</b><br>D. 734, H. 1 (3)  | $\text{Pb}_4(\text{OH})_2(\text{CO}_3)_2\text{SO}_4$  | Mc          | 6.50      | 2.01, 1.87   |
| <b>Lechatelierite</b><br>AM. 13, MA. 1  | $\text{SiO}_2$  | Am          | 2.20      | 1.458        |
| <b>Lecontite</b><br>D. 742, W. 99       | $\text{NaNH}_4\text{SO}_4 \cdot 2\text{H}_2\text{O}$  | Or          | 1.63      | 1.453, 1.440 |
| <b>Lehiite</b><br>AM. 15, MA. 4         | $(\text{Na}, \text{K})_2\text{Ca}_5\text{Al}_8(\text{OH})_{12}(\text{PO}_4)_8$<br>$\cdot 6\text{H}_2\text{O}$   | Mc or<br>Tc | 2.90      | 1.629, 1.600 |
| <b>Lehnerite</b><br>AM. 10, DL. 3 (1)   | = Ludlamite   | —           | —         | —            |

## 44 A KEY TO MINERAL GROUPS, SPECIES AND VARIETIES

| <i>Name and Reference.</i>                 | <i>Composition.</i>   | <i>Cr.</i>  | <i>G.</i> | <i>N.</i>    |
|--|---|-------------|-----------|--------------|
| <b>Lehrbachite</b><br>D. 50, AM. 15        | Mixt. of Clausthalite and Tie-<br>mannite   | —           | —         | —            |
| <b>Leifite</b><br>W. 348, MA. 1            | $\text{Na}_4\text{Al}_2\text{F}_2\text{Si}_9\text{O}_{22}$                                      | Hx          | 2.57      | 1.522, 1.518 |
| <b>Lengenbachite</b><br>Dl. 4 (1) MT.      | $\text{Ag}_2\text{Pb}_6\text{As}_1\text{S}_{13}$  | Tc          | 5.85      | Op           |
| <b>Leonhardite</b><br>W. 398, MA. 2        | = Laumontite  | —           | —         | —            |
| <b>Leonite</b><br>W. 113, H. 1 (3)         | $\text{K}_2\text{Mg}(\text{SO}_4)_2 \cdot 4\text{H}_2\text{O}$                                  | Mc          | 2.22      | 1.490, 1.483 |
| <b>Lepidocrocite</b><br>Dl. 3 (2), W. 48   | $\text{Fe}^{III}(\text{OH})\text{O}$  | Or          | 4.10      | 2.51, 1.94   |
| <b>Lepidolite</b><br>D. 460, W. 364        | $\text{Li}_4\text{K}_2\text{Al}_4\text{F}_4\text{Si}_8\text{O}_{23}^*$                          | Mc          | 2.85      | 1.556, 1.532 |
| <b>Lepidomelane</b><br>D. 462, W. 367      | Extra aluminous var. of Annite  | —           | —         | —            |
| <b>Lessingite</b><br>MA. 4, AM. 15         | $\text{H}_2\text{Ca}_2\text{Ce}_4\text{Si}_3\text{O}_{15}$                                      | ?           | 4.70      | 1.785, 1.779 |
| <b>Lettsomite</b><br>W. 116, H. 1 (3)      | = Cyanotrichite   | —           | —         | —            |
| <b>Leucaugite</b><br>W. 189                | Pale coloured variant of Augite   | —           | —         | —            |
| <b>Leucite</b><br>D. 321, W. 255           | $\text{KAl}(\text{SiO}_3)_2$  | Is ?        | 2.47      | 1.509, 1.508 |
| <b>Leucochalcite</b><br>D. 631, Dl. 3 (1)  | $\text{Cu}_2(\text{OH})\text{AsO}_4 \cdot \text{H}_2\text{O}$                                   | Or          | 4.8       | 1.84, 1.79   |
| <b>Leucophanite</b><br>D. 351, W. 242      | $\text{NaCaBeF}(\text{SiO}_3)_2$  | Or          | 2.95      | 1.598, 1.571 |
| <b>Leucophenicite</b><br>W. 225, Dl. 2 (1) | $\text{Mn}_7(\text{OH})_2(\text{SiO}_4)_3$  | Mc          | 3.85      | 1.786, 1.756 |
| <b>Leucosphenite</b><br>W. 244, Dl. 3 (1)  | $\text{Na}_4\text{BaTi}_2\text{Si}_{10}\text{O}_{27}$   | Mc          | 3.05      | 1.686, 1.642 |
| <b>Leucoxene</b><br>D. 510, W. 68          | = Titanite or Doelterite  | —           | —         | —            |
| <b>Leverrierite</b><br>W. 370, Dl. 2 (1)   | Possibly impure Pyrophyllite or<br>Montmorillonite, = Beidellite ?                              | Or          | 2.35      | 1.60         |
| <b>Levynite</b><br>D. 449, W. 393          | $\text{NaCa}_4\text{Al}_9\text{Si}_{18}\text{O}_{50} \cdot 25\text{H}_2\text{O}$                | Hx          | 2.12      | 1.496, 1.491 |
| <b>Lewisite</b><br>W. 157, Dl. 3 (1)       | $5\text{CaO} \cdot 3\text{Sb}_2\text{O}_5 \cdot 4\text{TiO}_2$                                  | Is          | 4.95      | 2.20         |
| <b>Lewistonite</b> †<br>AM. 15, MA. 4      | $(\text{K}, \text{Na})_2\text{Ca}_{13}(\text{OH})_8(\text{PO}_4)_8 \cdot 4\text{H}_2\text{O} ?$ | Tc or<br>Hx | 3.05      | 1.624, 1.613 |

\* E.S.S., R.S.W.A. XIII (1927), pp. 45, 46. Vide list of authorities.

† The published description suggests two minerals differing in composition, crystal structure and optical properties.

A KEY TO MINERAL GROUPS, SPECIES AND VARIETIES 45

| <i>Name and Reference.</i>                | <i>Composition.</i>  | <i>Cr.</i>  | <i>G.</i> | <i>N.</i>          |
|---|--|-------------|-----------|--------------------|
| <b>Libethenite</b><br>D. 562, Dl. 3 (1)   | $\text{Cu}_2(\text{OH})\text{PO}_4$  | Or          | 3.9       | 1.789, 1.702       |
| <b>Liebenerite</b><br>W. 270, Dl. 2 (2)   | = Muscovite  | —           | —         | —                  |
| <b>Liebigite</b><br>D. 308, W. 89         | $\text{CaCO}_3 \cdot \text{UO}_2\text{CO}_3 \cdot 20\text{H}_2\text{O}$<br>Poss. ident. with Uranothallite | —           | —         | —                  |
| <b>Lievrite</b><br>MT. Dl. 2 (3)          | = Ilvaite  | —           | —         | —                  |
| <b>Lillianite</b><br>D. 140, Dl. 4 (1)    | $\text{Pb}_3\text{Bi}_2\text{S}_6$   | Or ?        | 7.0       | Op                 |
| <b>Limonite</b><br>D. 259, Dl. 3 (2)      | Massive form of Goethite   | —           | —         | —                  |
| <b>Linarite</b><br>D. 741, H. 1 (3)       | $\text{PbCu}(\text{OH})_2\text{SO}_4$  | Mc          | 5.40      | 1.859, 1.809       |
| <b>Lindackerite</b><br>D. 681, W. 120     | $3\text{NiO} \cdot 6\text{CuO} \cdot 2\text{As}_2\text{O}_5 \cdot \text{SO}_3 \cdot 7\text{H}_2\text{O}$   | Mc ?        | 2.5       | 1.727, 1.629       |
| <b>Lindstromite</b><br>MA. 2, Dl. 4 (1)   | $\text{CuPbBi}_3\text{S}_6$  | ?           | 7.00      | Op                 |
| <b>Linnaeite</b><br>D. 79, Dl. 4 (1)      | $\text{Co}_3\text{S}_4$  | Is          | 4.85      | Op                 |
| <b>Lintonite</b><br>W. 394, D. 456        | Optical var. of Thomsonite   | —           | —         | —                  |
| <b>Liroconite</b><br>D. 654, W. 153       | $\text{Cu}_2\text{Al}(\text{OH})_4\text{AsO}_4 \cdot 5\text{H}_2\text{O}$                                  | Mc          | 2.95      | 1.675, 1.612       |
| <b>Liskeardite</b><br>D. 644, Dl. 3 (1)   | $(\text{Al}, \text{Fe})\text{AsO}_4 \cdot 8\text{H}_2\text{O}$   | Or          | 3.00      | 1.689, 1.661       |
| <b>Lithargite</b><br>W. 41, H. 1 (2)      | PbO  | Tt          | 9.15      | 2.66, 2.53         |
| <b>Lithiophilite</b><br>D. 544, H. 1 (4)  | $\text{LiMnPO}_4$  | Or          | 3.50      | 1.674, 1.665       |
| <b>Liveingite</b><br>Dl. 4 (1), DAp. 2    | $\text{Pb}_5\text{As}_8\text{S}_{17}$  | Mc          | ?         | Op                 |
| <b>Livingstonite</b><br>D. 109, Dl. 4 (1) | $\text{HgSb}_4\text{S}_7$  | Or          | 4.8       | 2.7 +              |
| <b>Loellingite</b><br>D. 97, Dl. 4 (1)    | $\text{FeAs}_2$  | Or          | 7.2       | Op                 |
| <b>Loewite</b><br>D. 757, H. 1 (3)        | $\text{Na}_2\text{Mg}(\text{SO}_4)_2 \cdot 2\text{H}_2\text{O}$  | Tt or<br>Hx | 2.37      | 1.490, 1.471       |
| <b>Loewigite</b><br>D. 802, H. 1 (3)      | = Alunite  | —           | —         | —                  |
| <b>Longbanite</b><br>Dl. 3 (1), W. 67     | $4\text{Mn}_5\text{SiO}_7 \cdot \text{Fe}'''\text{Sb}_2\text{O}_6 ?$                                       | Hx          | 4.75      | 2.36, 2.31,<br>AO. |
| <b>Lorandite</b><br>Dl. 4 (1), DAp. 1     | $\text{TlAsS}_2$   | Mc          | 5.53      | 2.72               |
| <b>Loranskite</b><br>Dl. 3 (1), DAp. 2    | Y, Zr, Ta, Nb, O, $\text{H}_2\text{O}$   | ?           | 4.5       | ?                  |



| <i>Name and Reference.</i>                              | <i>Composition.</i>  | <i>Cr.</i> | <i>G.</i> | <i>N.</i>    |
|---|--|------------|-----------|--------------|
| <b>Lorenzenite</b><br>W. 162, Dl. 3 (1)                 | $\text{Na}_2(\text{Ti, Zr})_2\text{Si}_2\text{O}_9$  | Or         | 3.42      | 1.788, 1.743 |
| <b>Lorettoite</b><br>W. 37, Dl. 4 (3)                   | $\text{Pb}_7\text{O}_6\text{Cl}_2$   | Tt         | 7.5       | 2.38, 2.35   |
| <b>Loseyite</b><br>AM. 14, MA. 4                        | $(\text{Mn, Zn})_7(\text{OH})_{10}(\text{CO}_3)_2$   | Mc         | 3.25      | 1.676, 1.637 |
| <b>Lossenite</b><br>W. 119, Dl. 3 (1)                   | = Impure Beudantite ?  | Or         | ?         | 1.818, 1.783 |
| <b>Lotrite</b><br>W. 352, DAp. 2                        | $3(\text{Ca, Mg})\text{O}, 2(\text{Al, Fe})_2\text{O}_3 \cdot 4\text{SiO}_2 \cdot 2\text{H}_2\text{O}$ | Mc ?       | 3.25      | 1.677, 1.663 |
| <b>Lousite</b><br>AM. 15, MA. 2                         | Mixt. of Apophyllite and Quartz  | —          | —         | —            |
| <b>Lovenite</b><br>Dl. 3 (1), W. 245                    | Ca, Mn, Na, Zr, Si, etc.   | Mc         | 3.50      | 1.75         |
| <b>Loxoclase</b><br>D. 313, MT.                         | Sodium-bearing var. of Orthoclase ;<br>or = Microperthite  | Mc         | —         | —            |
| <b>Lublinite</b><br>MA. 2, DAp. 3                       | Fibrous var. of Calcite  | —          | —         | —            |
| <b>Luckite</b><br>H. 1 (3), MT.                         | Manganif. var. of Melanterite  | —          | —         | —            |
| <b>Lucinite</b><br>W. 139, MA. 2                        | = Variscite  | —          | —         | —            |
| <b>Ludlamite</b><br>D. 638, Dl. 3 (1)                   | $\text{Fe}''_7(\text{OH})_2(\text{PO}_4)_4 \cdot 8\text{H}_2\text{O}$                                  | Mc         | 3.10      | 1.693, 1.652 |
| <b>Ludwigite</b><br>H. 1 (4), AM. 14                    | $\text{Mg}_2\text{Fe}'''\text{BO}_5$   | Or         | 3.95      | 1.98, 1.84   |
| <b>Luenebergite</b><br>W. 157, Dl. 3 (1)                | $3\text{MgO} \cdot \text{B}_2\text{O}_3 \cdot \text{P}_2\text{O}_5 \cdot 8\text{H}_2\text{O}$          | Mc         | 2.05      | 1.545, 1.520 |
| <b>Lutecite</b><br>W. 59, DAp. 1                        | Optical var. of Chalcedonite   | —          | —         | —            |
| <b>Luzonite</b><br>Dl. 4 (1), MA. 4                     | Mixt. of Enargite and Famatinite   | —          | —         | —            |
| <b>Lyndochite</b><br>AM. 12, MA. 3                      | = Euxenite   | —          | —         | —            |
| <b>Macgovernite</b><br>AM. 12, MA. 3                    | Mn, Mg, Zn, $\text{SiO}_3$ , $\text{AsO}_3$ , $\text{AsO}_4$   | Hx ?       | 3.70      | 1.75         |
| <b>Mackintoshite</b><br>(Texas)<br>DAp. 1, W. 52        | $\text{U}^4\text{Th}_3\text{Si}_3\text{O}_{14} \cdot 3\text{H}_2\text{O}$                              | Tt         | 5.45      | 1.77         |
| <b>Mackintoshite</b><br>(W. Australia)<br>AM. 13, MA. 4 | = Maitlandite  | —          | —         | —            |
| <b>Magnesiocronstedtite</b><br>W. 382, MA. 3            | $\text{H}_4\text{Mg}_3\text{Fe}'''\text{SiO}_9$ . Hypothetical<br>mol. in chlorite group               | Mc         | —         | —            |
| <b>Magnesioferrite</b><br>D. 238, H. 1 (4)              | $\text{MgFe}'''\text{O}_4$   | Is         | 4.6       | 2.35, AO     |

| <i>Name and Reference.</i>                     | <i>Composition.</i>   | <i>Cr.</i> | <i>G.</i>    | <i>N.</i>        |
|--|---|------------|--------------|------------------|
| <b>Magnesiopectolite</b><br>W. 245, DAp. 2     | Magnesian var. of Pectolite   | Mc         | 2.70         | 1.57, 1.53       |
| <b>Magnesite</b><br>D. 272, H. 1 (3)           | MgCO <sub>3</sub>   | Hx         | 2.97         | 1.700, 1.509     |
| <b>Magnesiorthite</b><br>MA. 3, W. 359         | Var. of Allanite with much Mg and F   | Mc         | 3.90         | 1.733, 1.715     |
| <b>Magnetite</b><br>D. 237, H. 1 (4)           | Fe <sub>3</sub> O <sub>4</sub>  | Is         | 5.15         | Op or 2.42       |
| <b>Magnetoplumbite</b><br>MA. 3, AM. 11        | (Mn, Pb)Fe <sub>2</sub> O <sub>4</sub> ?  | Hx         | 5.50         | Op               |
| <b>Magnochromite</b><br>D. 234, MT.            | = Mitchellite   | —          | —            | —                |
| <b>Maitlandite</b><br>RSWA. 16, MA. 4          | (Pb, Ca) <sub>2</sub> Th <sub>3</sub> U <sub>4</sub> Si <sub>8</sub> O <sub>32</sub> · 23H <sub>2</sub> O | Am         | 4.40         | ?                |
| <b>Malachite</b><br>W. 85, H. 1 (3)            | Cu <sub>2</sub> (OH) <sub>2</sub> CO <sub>3</sub>   | Mc         | 4.00         | 1.909, 1.655     |
| <b>Malacon</b><br>W. 51, D. 394                | = Cyrtolite   | —          | —            | —                |
| <b>Maldonite</b><br>DL. 4 (1), H. 1 (1)        | Au <sub>2</sub> Bi  | Is         | 9.7 ?        | Op               |
| <b>Malinovskite</b><br>MT.                     | Lead-bearing var. of Tetrahedrite   | —          | —            | —                |
| <b>Malladrite</b><br>DL. 4 (3), W. 36          | Na <sub>2</sub> SiF <sub>6</sub>  | Or         | 2.75,        | 1.312, 1.309     |
| <b>Mallardite</b><br>D. 752, H. 1 (3)          | MnSO <sub>4</sub> · 7H <sub>2</sub> O   | Mc         | 1.87         | ?                |
| <b>Manandonite</b><br>W. 96, DL. 2 (2)         | H <sub>24</sub> Li <sub>4</sub> Al <sub>14</sub> B <sub>4</sub> Si <sub>6</sub> O <sub>53</sub>           | Or         | 2.89         | 1.6              |
| <b>Manganandalusite</b><br>W. 234, DL. 2 (2)   | Manganiferous var. of Andalusite  | —          | —            | —                |
| <b>Manganapatite</b><br>DL. 3 (1), W. 129      | Manganiferous var. of Fluorapatite  | Hx         | 3.20         | 1.642, 1.639     |
| <b>Manganaxinite</b><br>W. 254, DL. 2 (3)      | HMnCa <sub>2</sub> Al <sub>2</sub> B(SiO <sub>4</sub> ) <sub>4</sub>                                      | Tc         | 3.25         | 1.689, 1.679     |
| <b>Mangandolomite</b><br>W. 71, MM. 20         | CaMn(CO <sub>3</sub> ) <sub>2</sub>   | Hx         | 3.20         | 1.75, 1.55       |
| <b>Manganhedenbergite</b><br>MT., DL. 2 (1)    | Manganiferous var. of Hedenbergite  | —          | —            | —                |
| <b>Manganite</b><br>D. 258, DL. 3 (2)          | Mn <sup>III</sup> (OH)O   | Or         | 4.35         | 2.53, 2.25 or Op |
| <b>Manganocalcite</b><br>AM. 15, H. 1 (3)      | = Mangandolomite  | —          | —            | —                |
| <b>Manganocolumbite</b><br>W. 160, H. 1 (4)    | MnNb <sub>2</sub> O <sub>6</sub>  | Or         | 5.2–<br>6.55 | 2.45 or Op       |
| <b>Manganolangbeinite</b><br>W. 111, DL. 4 (2) | Mn <sub>2</sub> K <sub>2</sub> (SO <sub>4</sub> ) <sub>3</sub>  | Is         | 3.02         | 1.572            |

48 A KEY TO MINERAL GROUPS, SPECIES AND VARIETIES

| <i>Name and Reference.</i>                  | <i>Composition.</i>  | <i>Cr.</i>  | <i>G.</i>    | <i>N.</i>           |
|---|--|-------------|--------------|---------------------|
| <b>Manganomossite</b><br>MM. 20, AM. 12     | $MnNb_2O_6$  | Tt          | 5.2-<br>6.5  | Op                  |
| <b>Manganophyllite</b><br>D. 462, Dl. 2 (2) | Manganiferous var. of Biotite  | Mc          | 3.05         | ?                   |
| <b>Manganosiderite</b><br>D. 274            | = Oligonite  | —           | —            | —                   |
| <b>Manganosite</b><br>D. 226, W. 41         | $MnO$  | Is          | 5.25         | 2.16                |
| <b>Manganostibiite</b><br>D. 583, W. 151    | $Mn_9O_6(SbO_4)_2$   | Mc          | ?            | 1.96, 1.92          |
| <b>Manganotantalite</b><br>W. 160, H. 1 (4) | $MnTa_2O_6$  | Or          | 6.55-<br>7.9 | 2.34, 2.19 or<br>Op |
| <b>Marcasite</b><br>D. 96, Dl. 4 (1)        | (1) $FeS_2$<br>(2) Group name incl. Arsenopyrite,<br>Glaucodot, Safflorite, Lautite,<br>etc. | Or          | 4.90         | Op                  |
| <b>Margarite</b><br>D. 464, W. 385          | $H_2CaAl_4Si_2O_{12}$  | Mc          | 3.05         | 1.639, 1.626        |
| <b>Margarosanite</b><br>W. 219, MA. 1       | $Ca_2Pb(SiO_3)_3$  | Tc          | 4.40         | 1.807, 1.729        |
| <b>Marialite</b><br>D. 389, Dl. 2 (2)       | $Na_4Al_3ClSi_9O_{24}$   | Tt          | 2.57         | 1.546, 1.540        |
| <b>Marmatite</b><br>MT., Dl. 4 (1)          | = Christophite   | —           | —            | —                   |
| <b>Marshite</b><br>W. 30, Dl. 4 (3)         | $CuI$  | Is          | 5.70         | 2.345               |
| <b>Martinite</b><br>D. 620, Dl. 3 (1)       | $H_2Ca_5(PO_4)_4 \cdot H_2O$   | Or or<br>Mc | 2.90         | 1.61, 1.59          |
| <b>Martite</b><br>D. 232, MT.               | = Hæmatite in pseudomorphs after<br>Magnetite  | —           | —            | —                   |
| <b>Mascagnite</b><br>D. 714, H. 1 (3)       | $(NH_4)_2SO_4$   | Or          | 1.77         | 1.533, 1.520        |
| <b>Massicotite</b><br>D. 229, W. 41         | $PbO$  | Or          | 9.30         | 2.71, 2.51          |
| <b>Matildite</b><br>D. 120, Dl. 4 (1)       | $AgBiS_2$  | ?           | 7.05         | AO                  |
| <b>Matlockite</b><br>D. 186, Dl. 4 (3)      | $Pb_2OCl_2$  | Tt          | 7.20         | 2.15, 2.04          |
| <b>Maucherite</b><br>DAp. 3, Dl. 4 (1)      | $Ni_3As_2$ or $Ni_4As_3$   | Tt          | 7.85         | Op                  |
| <b>Maufite</b><br>MA. 4, AM. 15             | $(Mg, Ni)Al_4Si_3O_{13} \cdot 4H_2O$   | ?           | 2.27         | ?                   |
| <b>Mazapilite</b><br>D. 651, Dl. 3 (1)      | $Ca_3Fe''''_4(OH)_6(AsO_4)_4 \cdot 3H_2O$  | Or          | 3.60         | 1.898, 1.815        |
| <b>Meerschaum</b><br>D. 485, H. 2           | = Sepiolite  | —           | —            | —                   |

| <i>Name and Reference.</i>              | <i>Composition.</i>  | <i>Cr.</i> | <i>G.</i> | <i>N.</i>         |
|---|--|------------|-----------|-------------------|
| <b>Meionite</b><br>D. 386, Dl. 2 (2)    | $\text{Ca}_4\text{Al}_6(\text{CO}_3)(\text{SiO}_4)_6$  | Tt         | 2.77      | 1.60, 1.56        |
| <b>Melaconite</b><br>D. 230, H. 1 (2)   | = Tenorite   | —          | —         | —                 |
| <b>Melanite</b><br>W. 266, H. 2         | = Schorlomite  | —          | —         | —                 |
| <b>Melanocerite</b><br>D. 348, W. 248   | $\text{Ca}_{12}\text{Ce}_{10}\text{Y}_3\text{F}_{10}(\text{OH})_4\text{B}_3\text{Si}_{12}\text{O}_{53}$  | Hx         | 4.15      | 1.73, 1.72        |
| <b>Melanophlogite</b><br>W. 56, MT.     | Sulphurous var. of Cristobalite, a mixture   | Is         | 2.04      | 1.46              |
| <b>Melanotekite</b><br>D. 421, W. 276   | $\text{Pb}_2\text{Fe}'''\text{Si}_2\text{O}_9$   | Or         | 5.75      | 2.31, 2.12        |
| <b>Melanovanadite</b><br>W. 104, MA. 1  | $2\text{CaO} \cdot 2\text{V}_2\text{O}_4 \cdot 3\text{V}_2\text{O}_5(+\text{H}_2\text{O})$   | Mc         | 3.48      | 1.7               |
| <b>Melanterite</b><br>D. 751, H. 1 (3)  | (1) $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$<br>(2) Group name incl. Bieberite, Boothite and Mallardite   | Me         | 1.90      | 1.486, 1.471      |
| <b>Melilite</b><br>D. 391, AM. 14       | (1) $\text{Ca}_2\text{Al}_2\text{SiO}_7 + \text{Ca}_2\text{MgSi}_2\text{O}_7 + \text{Na}_2\text{Si}_3\text{O}_7$<br>(2) Group name incl. Gehlenite, Okermanite and Soda melilite | Tt<br>—    | 3.0<br>—  | 1.653, 1.651<br>— |
| <b>Meliphanite</b><br>D. 352, W. 242    | $\text{NaCa}_2\text{Be}_2\text{FSi}_3\text{O}_{10}$  | Tt         | 3.00      | 1.613, 1.593      |
| <b>Mellite</b><br>D. 824, W. 90         | $\text{Al}_2\text{C}_{12}\text{O}_{12} \cdot 18\text{H}_2\text{O}$   | Tt         | 1.60      | 1.539, 1.511      |
| <b>Melnikovite</b><br>Dl. 4 (1), MA. 3  | $\text{FeS}_2$   | Am         | 4.25      | Op                |
| <b>Melonite</b><br>D. 77, Dl. 4 (1)     | $\text{Ni}_2\text{Te}_3$   | Hx         | 7.35      | Op                |
| <b>Menaccanite</b><br>D. 233, H. 1 (2)  | $\text{FeTiO}_3 \cdot \text{Fe}_2\text{O}_3$ . Var. of Ilmenite or Hæmatite  | Hx         | 4.95      | Op                |
| <b>Mendipite</b><br>D. 187, W. 37       | $\text{Pb}_3\text{O}_2\text{Cl}_2$   | Tt         | 7.25      | 2.31, 2.24        |
| <b>Mendozite</b><br>D. 766, Dl. 4 (2)   | $\text{NaAl}(\text{SO}_4)_3 \cdot 12\text{H}_2\text{O}$  | Mc ?       | 1.75      | 1.458, 1.432      |
| <b>Meneghinite</b><br>D. 151, Dl. 4 (1) | $\text{Pb}_4\text{Sb}_2\text{S}_7$   | Or         | 6.40      | Op                |
| <b>Mercury</b><br>D. 16, Dl. 3 (2)      | Hg   | Is         | 14.2      | Op                |
| <b>Merrillite</b><br>W. 146, MA. 1      | $\text{Na}_2\text{Ca}_3\text{O}(\text{PO}_4)_2$  | Hx         | 3.10      | 1.623, 1.620      |
| <b>Merwinite</b><br>W. 198, MA. 1       | $\text{Ca}_3\text{Mg}(\text{SiO}_4)_2$   | Mc         | 3.15      | 1.718, 1.708      |
| <b>Mesitite</b><br>D. 272, H. 1 (3)     | $\text{MgFe}''(\text{CO}_3)_2$   | Hx         | 3.40      | 1.788, 1.570      |
| <b>Mesolite</b><br>D. 455, W. 405       | Sodium-bearing var. of Scolecite   | Mc         | 2.27      | 1.506, 1.505      |

| <i>Name and Reference.</i>                 | <i>Composition.</i>  | <i>Cr.</i> | <i>G.</i> | <i>N.</i>    |
|--|--|------------|-----------|--------------|
| <b>Messelite</b><br>D. 593, Dl. 3 (1)      | $\text{Ca}_2\text{Fe}''(\text{PO}_4)_2 \cdot 2\text{H}_2\text{O}$                            | Tc         | 3.0       | 1.680, 1.644 |
| <b>Metabrushite</b><br>Dl. 3 (1), Ls.      | = Brushite   | —          | —         | —            |
| <b>Metacinnabarite</b><br>D. 59, Dl. 4 (1) | HgS  | Is         | 7.65      | ?            |
| <b>Metacristobalite</b><br>W. 55, AM. 13   | $\text{SiO}_2$   | Is         | 2.30      | 1.486        |
| <b>Metagadolinite</b><br>MT., D. 404       | $\text{Be}_2\text{Fe}''\text{Y}_2(\text{OH})_6(\text{SiO}_4)_2$                              | ?          | 3.55      | ?            |
| <b>Metahewettite</b><br>W. 156, Dl. 3 (1)  | $\text{H}_2\text{CaV}_6\text{O}_{17} \cdot 8\text{H}_2\text{O}$                              | Or         | 2.50      | 2.23, 1.70   |
| <b>Metarossite</b><br>MA. 3, AM. 13        | $\text{H}_4\text{Ca}(\text{VO}_4)_2$   | ?          | ?         | 1.85, 1.84   |
| <b>Metathenardite</b><br>W. 98, LF. 4      | $\text{Na}_2\text{SO}_4$   | Or         | ?         | ?            |
| <b>Metatorbernite</b><br>W. 143, MA. 1     | $\text{CuU}_2\text{O}_4(\text{PO}_4)_2 \cdot 8\text{H}_2\text{O}$                            | Tt         | 3.67      | 1.626, 1.624 |
| <b>Metavariscite</b><br>W. 139, MA. 2      | $\text{AlPO}_4 \cdot 2\text{H}_2\text{O}$  | Or         | 2.55      | 1.582, 1.551 |
| <b>Metavauxite</b><br>MA. 3, AM. 12        | $\text{Fe}''\text{Al}_2(\text{OH})_2(\text{PO}_4)_2 \cdot 3\text{H}_2\text{O}$               | Mc         | 2.34      | 1.577, 1.550 |
| <b>Metavoltite</b><br>D. 797, Dl. 4 (2)    | Impure Jarosite  | —          | —         | —            |
| <b>Metazeunerite</b><br>W. 144, MA. 2.     | $\text{CuU}_2\text{O}_4(\text{AsO}_4)_2 \cdot 8\text{H}_2\text{O}$                           | Tt         | 3.30      | 1.585, 1.576 |
| <b>Meyerhofferite</b><br>W. 94, H. 1 (4)   | $\text{Ca}_2\text{B}_6\text{O}_{11} \cdot 7\text{H}_2\text{O}$                               | Tc         | 2.12      | 1.560, 1.500 |
| <b>Meymacite</b><br>D. 220, Dl. 4 (3)      | $\text{H}_4\text{WO}_5$  | Am         | 4.5       | ?            |
| <b>Miargyrite</b><br>D. 121, Dl. 4 (1)     | (1) $\text{AgSbS}_2$<br>(2) Group name incl. Lorandite,<br>Plenargyrite and Smithite         | Mc         | 5.25      | 2.72 +       |
| <b>Mica</b><br>D. 458, W. 359              | Group name incl. Biotite, Lepidolite, Monrepite, Muscovite, etc.                             | —          | —         | —            |
| <b>Microcline</b><br>D. 315, W. 323        | $\text{KAlSi}_3\text{O}_8$   | Tc         | 2.56      | 1.525, 1.518 |
| <b>Microlite</b><br>D. 522, H. 1 (4)       | $\text{NaCaF}(\text{TaO}_3)_2$   | Is         | 5.75      | 1.920        |
| <b>Microsommite</b><br>W. 271, Dl. 2 (2)   | $(\text{Na}, \text{K})_{10}\text{Ca}_4\text{Al}_{12}\text{SCl}_4\text{Si}_{12}\text{O}_{52}$ | Hx         | 2.60      | 1.530, 1.522 |
| <b>Miedziankite</b><br>MA. 3, Dl. 4 (1)    | Zinkiferous var. of Tennantite   | Is         | 4.70      | Op           |
| <b>Miersite</b><br>W. 30, Dl. 4 (3)        | $\text{Ag}_4\text{CuI}_5$  | Is         | 5.65      | 2.20         |
| <b>Milarite</b><br>D. 311, W. 348          | $\text{HKCa}_2\text{Al}_2\text{Si}_{12}\text{O}_{30}$  | Hx         | 2.57      | 1.534, 1.532 |

A KEY TO MINERAL GROUPS, SPECIES AND VARIETIES 51

| <i>Name and Reference.</i>                | <i>Composition.</i>   | <i>Cr.</i>  | <i>G.</i> | <i>N.</i>    |
|---|---|-------------|-----------|--------------|
| <b>Millerite</b><br>D. 70, Dl. 4 (1)      | (1) NiS<br>(2) Group name incl. Breithauptite, Greenockite, Niccolite, Pyrrhotite, etc. | Hx          | 5.60      | Op           |
| <b>Millisite</b><br>AM. 15, MA. 4         | $\text{NaCaAl}_6(\text{OH})_9(\text{PO}_4)_4 \cdot 4\text{H}_2\text{O}$                 | Or          | 2.83      | 1.602, 1.584 |
| <b>Miloschite</b><br>W. 240, Dl. 2 (2)    | Chromiferous var. of Kaolinite  | Mc          | 2.65      | 1.560, 1.553 |
| <b>Mimetite</b><br>D. 551, H. 1 (4)       | $\text{Pb}_5\text{Cl}(\text{AsO}_4)_3$  | Hx          | 7.10      | 2.135, 2.118 |
| <b>Minasragrite</b><br>W. 111, H. 1 (3)   | $\text{V}_2\text{O}_4 \cdot 3\text{SO}_3 \cdot 16\text{H}_2\text{O}$                    | Mc          | ?         | 1.542, 1.518 |
| <b>Minervite</b><br>Dl. 3 (1), LF. 4      | $\text{H}_2\text{KAl}_2(\text{PO}_4)_3 \cdot 7\text{H}_2\text{O}$                       | Biax.       | 2.0       | ?            |
| <b>Minium</b><br>D. 244, H. 1 (3)         | $\text{Pb}_3\text{O}_4$   | Or          | 8.90      | 2.40         |
| <b>Mirabilite</b><br>D. 743, H. 1 (3)     | $\text{Na}_2\text{SO}_4 \cdot 10\text{H}_2\text{O}$                                     | Mc          | 1.47      | 1.419, 1.396 |
| <b>Misenite</b><br>D. 735, H. 1 (3)       | $\text{HKSO}_4$   | Mc          | 2.35      | 1.487, 1.475 |
| <b>Mispickel</b><br>D. 98, Dl. 4 (1)      | = Arsenopyrite  | —           | —         | —            |
| <b>Mitchellite</b><br>D. 234, MM. 19      | Chromiferous var. of Spinel   | Is          | —         | —            |
| <b>Mitscherlichite</b><br>MA. 4, ICT      | $\text{K}_2\text{CuCl}_4 \cdot 2\text{H}_2\text{O}$                                     | Tt          | 2.41      | 1.636, 1.615 |
| <b>Mixite</b><br>D. 668, Dl. 3 (1)        | $\text{Cu}_{10}\text{Bi}(\text{OH})_8(\text{AsO}_4)_5 \cdot 7\text{H}_2\text{O}$        | Mc or<br>Tc | 3.80      | 1.820, 1.738 |
| <b>Mizzonite</b><br>D. 389, W. 347        | Sodium-bearing var. of Meionite   | Tt          | 2.70      | 1.585, 1.553 |
| <b>Modderite</b><br>MT., MM. 21           | = Jaipurite   | —           | —         | —            |
| <b>Moissanite</b><br>W. 17, Dl. 1         | SiC   | Hx          | 3.20      | 2.697, 2.654 |
| <b>Molengraafite</b><br>W. 244, Dl. 3 (1) | Na, Ca, $\text{SiO}_3$ , $\text{TiO}_3$   | Mc          | ?         | 1.770, 1.735 |
| <b>Molybdenite</b><br>D. 34, Dl. 4 (1)    | $\text{MoS}_2$  | Hx          | 4.70      | Op           |
| <b>Molybdite</b><br>D. 219, W. 109        | = Ferrimolybdite  | —           | —         | —            |
| <b>Molybdomenite</b><br>D. 811, Dl. 4 (1) | $\text{PbSeO}_3$ ?  | Or          | ?         | ?            |
| <b>Molybdophyllite</b><br>DAp. 2, W. 220  | $\text{MgPbSiO}_4 \cdot \text{H}_2\text{O}$   | Hx          | 4.70      | 1.815, 1.761 |
| <b>Molysite</b><br>D. 181, Dl. 4 (3)      | $\text{FeCl}_3$   | Hx          | 2.8       | ?            |
| <b>Monazite</b><br>D. 537, H. 1 (4)       | $(\text{Ce}, \text{La})\text{PO}_4$   | Mc          | 5.10      | 1.843, 1.793 |
| <b>Monetite</b><br>D. 560, Dl. 3 (1)      | $\text{HCaPO}_4$  | Tc          | 2.75      | 1.623, 1.604 |

| <i>Name and Reference.</i>                  | <i>Composition.</i>                       | <i>Cr.</i> | <i>G.</i>          | <i>N.</i>    |
|---|---|------------|--------------------|--------------|
| <b>Monheimite</b><br>W. 80, H. 1 (3)        | $ZnFe(CO_3)_2$                            | Hx         | 4.15               | 1.86, 1.63   |
| <b>Monimolite</b><br>D. 539, H. 1 (4)       | $(Pb, Ca, Fe)_3(SbO_4)_2$                 | Is         | 6.6                | ?            |
| <b>Monrepite</b><br>MA. 3, AM. 14           | $H_2KFe''_3Fe'''(SiO_4)_3$                | Mc         | ?                  | ?            |
| <b>Montanite</b><br>D. 808, H. 1 (3)        | $Bi_2(OH)_4TeO_4$                         | Mc?        | 3.80               | 2.09, 2.08   |
| <b>Montebrasite</b><br>W. 148, Dl. 3 (1)    | $LiAl(OH)PO_4$                            | Tc         | 3.05               | 1.635, 1.612 |
| <b>Monticellite</b><br>D. 374, W. 165       | $CaMgSiO_4$                               | Or         | 3.2                | 1.668, 1.650 |
| <b>Montmorillonite</b><br>D. 496, Dl. 2 (2) | $MgAl_2Si_5O_{14} \cdot 6H_2O$            | ?          | 2.1                | 1.516, 1.493 |
| <b>Montroydite</b><br>W. 41, H. 1           | HgO                                       | Or         | 11.2               | 2.65, 2.37   |
| <b>Mooreite</b><br>AM. 14, MA. 4            | $(Mg, Zn, Mn)_8(OH)_{14}SO_4 \cdot 4H_2O$ | Mc         | 2.50               | 1.547, 1.533 |
| <b>Mordenite</b><br>D. 437, W. 404          | $Na_2CaAl_4Si_{16}O_{40} \cdot 12H_2O$    | Mc         | 2.10               | 1.471, 1.466 |
| <b>Morenosite</b><br>D. 750, H. 1 (3)       | $NiSO_4 \cdot 7H_2O$                      | Or         | 1.95               | 1.492, 1.467 |
| <b>Morinite</b><br>W. 154, H. 1 (4)         | $HNa_2Ca_3Al_3F_6(PO_4)_4 \cdot 8H_2O$    | Mc         | 2.95               | 1.55         |
| <b>Mosandrite</b><br>D. 516, Dl. 3 (1)      | $Na_2Ca_3Ce(OH)_2(Ti, Zr)Si_5O_{16}$      | Mc         | 3.00               | 1.658, 1.646 |
| <b>Mosesite</b><br>W. 34, Dl. 4 (3)         | $NH_4, Hg, Cl, SO_4$                      | Is         | ?                  | 2.065        |
| <b>Mossite</b><br>Dap. 1, H. 1 (4)          | $FeNb_2O_6$                               | Tt         | 5.20<br>to<br>6.55 | AO           |
| <b>Mottramite</b><br>Dl. 3 (1), MT.         | $2PbCu(OH)VO_4 \cdot H_2O$                | Or         | 5.90               | 2.33, 2.22   |
| <b>Mullite</b><br>W. 235, MA. 3             | $Al_6Si_2O_{13}$                          | Or         | 3.10               | 1.654, 1.642 |
| <b>Muscovite</b><br>D. 458, W. 361          | $H_2KAl_3(SiO_4)_3$                       | Mc         | 2.87               | 1.588, 1.552 |
| <b>Muthmannite</b><br>Dap. 3, Dl. 4 (1)     | Auriferous var. of Empressite             | ?          | ?                  | Op           |
| <b>Nacrite</b><br>W. 239, AM. 15            | $H_4Al_2Si_2O_9$                          | Mc         | 2.60               | 1.563, 1.557 |
| <b>Nadorite</b><br>W. 155, Dl. 3 (1)        | $PbCl_2 \cdot PbO \cdot Sb_2O_3$          | Or         | 7.00               | 2.40, 2.30   |
| <b>Naegite</b><br>W. 67, Dl. 3 (1)          | $(Zr, Th, Ce)SiO_4?$ Possibly a mixture   | Tt         | 4.10               | 1.82         |
| <b>Nagyagite</b><br>D. 106, Dl. 4 (1)       | $Au_2Pb_{10}Sb_2Te_6S_{16}?$              | Or         | 7.3                | Op           |
| <b>Nahcolite</b><br>MM. 22, H. 1 (3)        | NaHCO                                     | Mc         | 2.22               | ?            |

A KEY TO MINERAL GROUPS, SPECIES AND VARIETIES 53

| <i>Name and Reference.</i>                           | <i>Composition.</i>  | <i>Cr.</i> | <i>G.</i> | <i>N.</i>    |
|--|--|------------|-----------|--------------|
| <b>Nantokite</b><br>D. 165, DL. 4 (3)                | CuCl   | Is         | 3.70      | 1.930        |
| <b>Narsarsukite</b><br>DL. 3 (1), W. 347             | $\text{Na}_{12}\text{Fe}'''\text{Si}_{24}\text{Ti}_4\text{O}_{65}$   | Tt         | 2.75      | 1.584, 1.553 |
| <b>Nasonite</b><br>W. 220, MA. 1                     | $\text{Ca}_4\text{Pb}_6\text{Cl}_2\text{Si}_6\text{O}_{21}$  | Hx         | 5.45      | 1.927, 1.917 |
| <b>Natroalunite</b><br>W. 114, H. 1 (3)              | $\text{NaAl}_3(\text{OH})_6(\text{SO}_4)_2$  | Hx         | 2.57      | 1.59, 1.57   |
| <b>Natroamblygonite</b><br>DL. 3 (1), H. 1 (4)       | = Fremontite   | —          | —         | —            |
| <b>Natrochalcite</b><br>W. 112, H. 1 (3)             | $\text{Na}_2\text{Cu}_4(\text{OH})_2(\text{SO}_4)_4 \cdot 2\text{H}_2\text{O}$   | Mc         | 2.33      | 1.714, 1.649 |
| <b>Natrodavynite</b><br>W. 271, MT.                  | Potash-free var. of Cancrinite   | Hx         | 2.45      | 1.527, 1.522 |
| <b>Natrojarosite</b><br>W. 114, H. 1 (3)             | $\text{NaFe}'''\text{Si}_3(\text{OH})_6(\text{SO}_4)_2$  | Hx         | 3.10      | 1.832, 1.750 |
| <b>Natrolite</b><br>D. 453, W. 396                   | (1) $\text{Na}_2\text{Al}_2\text{Si}_3\text{O}_{10} \cdot 2\text{H}_2\text{O}$<br>(2) Group name incl. Mesolite<br>and Scolecite | Or         | 2.25      | 1.489, 1.477 |
| <b>Natron</b><br>D. 296, H. 1 (3)                    | $\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$  | Mc         | 1.46      | 1.440, 1.405 |
| <b>Natronitrite</b><br>D. 683, H. 1 (3)              | $\text{NaNO}_3$  | Hx         | 2.26      | 1.586, 1.337 |
| <b>Natrophilite</b><br>D. 545, DL. 3 (1)             | $\text{NaMnPO}_4$  | Or         | 3.40      | 1.684, 1.671 |
| <b>Naumannite</b><br>D. 48, DL. 4 (1)                | $\text{Ag}_2\text{PbSe}_2$   | Is         | 8.00      | Op           |
| <b>Neotantalite</b><br>LF. 4, DL. 3 (1)              | $\text{NaFeFTa}_2\text{O}_6$   | Is         | 5.20      | ?            |
| <b>Neotocite</b><br>D. 509, W. 232                   | $\text{MnSiO}_3 \cdot x\text{H}_2\text{O}$   | Am         | 2.70      | 1.54         |
| <b>Nephelite</b><br>(Nepheline)<br>D. 357, DL. 2 (2) | (1) $\text{NaAlSiO}_4$<br>(2) Group name incl. Eucryptite<br>and Kaliophilite  | Hx         | 2.60      | 1.543, 1.539 |
| <b>Nephrite</b><br>D. 338, DL. 2 (2)                 | Dense structureless var. of Tremolite  | —          | —         | —            |
| <b>Nepouite</b><br>W. 376, DL. 2 (1)                 | $\text{H}_4\text{Ni}_2\text{Si}_2\text{O}_9$   | Mc         | 3.20      | 1.63, 1.59   |
| <b>Neptunite</b><br>DL. 3 (1), W. 244                | $(\text{Na}, \text{K})_2\text{Fe}'''\text{TiSi}_4\text{O}_{12}$  | Mc         | 3.20      | 1.736, 1.690 |
| <b>Nesquehonite</b><br>D. 295, ICT.                  | $\text{MgCO}_3 \cdot 3\text{H}_2\text{O}$  | Or         | 1.85      | 1.526, 1.412 |
| <b>Nevyanskite</b><br>D. 22, H. 1                    | Variety of Osmiridium with high Ir   | Hx         | 20        | Op           |
| <b>Newberyite</b><br>D. 621, W. 123                  | $\text{HMgPO}_4 \cdot 3\text{H}_2\text{O}$   | Or         | 2.10      | 1.533, 1.514 |
| <b>Newtonite</b><br>D. 494, AM. 11                   | = Alunite  | —          | —         | —            |



| <i>Name and Reference.</i>                  | <i>Composition.</i>   | <i>Cr.</i>  | <i>G.</i>   | <i>N.</i>    |
|---|---|-------------|-------------|--------------|
| <b>Niccolite</b><br>D. 71, Dl. 4 (1)        | NiAs  | Hx          | 7.60        | Op           |
| <b>Nicholsonite</b><br>MM. 16, DAp. 3       | Zinkiferous var. of Aragonite   | —           | —           | —            |
| <b>Nicolayite</b><br>RSWA. 16, MA. 4        | (Pb, Ca) <sub>2</sub> Th <sub>3</sub> U <sub>4</sub> Si <sub>3</sub> O <sub>36</sub> · 21H <sub>2</sub> O                           | Am          | 4.15        | 1.617        |
| <b>Nigrine</b><br>D. 250, Dl. 3 (1)         | Fe, Nb and Ta-bearing var. of Rutile, Ti <sub>3</sub> O <sub>6</sub> + Fe''Nb <sub>2</sub> O <sub>6</sub> + Fe'''NbTiO <sub>6</sub> | Tt          | 4.2-<br>4.8 | AO           |
| <b>Nitratite</b><br>W. 90, H. 1 (3)         | = Natronitrite  | —           | —           | —            |
| <b>Nitre</b><br>D. 684, W. 91               | KNO <sub>3</sub>  | Or          | 2.11        | 1.506, 1.335 |
| <b>Nitrobarite</b><br>D. 687, H. 1 (3)      | Ba(NO <sub>3</sub> ) <sub>2</sub>   | Is          | 3.25        | 1.572        |
| <b>Nitrocalcite</b><br>H. 1 (3), ICT.       | Ca(NO <sub>3</sub> ) <sub>2</sub> · 4H <sub>2</sub> O   | Mc          | 1.82        | 1.504, 1.465 |
| <b>Nitroglauberite</b><br>D. 690, W. 119    | Probably impure Darapskite  | —           | —           | —            |
| <b>Nitromagnesite</b><br>D. 686, W. 91      | Mg(NO <sub>3</sub> ) <sub>2</sub> · 6H <sub>2</sub> O   | Mc          | ?           | 1.506, 1.344 |
| <b>Nocerite</b><br>D. 195, Dl. 4 (3)        | Ca <sub>3</sub> Mg <sub>3</sub> O <sub>2</sub> F <sub>8</sub>   | Hx          | 2.95        | 1.508, 1.486 |
| <b>Nontronite</b><br>W. 238, AM. 13         | H <sub>4</sub> Fe''' <sub>2</sub> Si <sub>2</sub> O <sub>9</sub>  | Mc          | 2.5         | 1.62, 1.59   |
| <b>Norbergite</b><br>MA. 3, ZK. 70          | Mg <sub>3</sub> (F,OH) <sub>2</sub> SiO <sub>4</sub>  | Or or<br>Mc | 3.15        | 1.590, 1.563 |
| <b>Nordenskiöldine</b><br>D. 691, Dl. 3 (2) | CaSn(BO <sub>3</sub> ) <sub>2</sub>   | Hx          | 4.2 ?       | 1.77         |
| <b>Normannite</b><br>MM. 21, AM. 15         | 3Bi <sub>2</sub> O <sub>3</sub> · CO <sub>2</sub> . Probably mixture of Bismite and Bismutosphaerite                                | —           | —           | —            |
| <b>Northupite</b><br>W. 87, H. 1 (3)        | Na <sub>3</sub> MgCl(CO <sub>3</sub> ) <sub>2</sub>   | Is          | 2.38        | 1.514        |
| <b>Nosean</b><br>D. 364, H. 2               | = Noselite  | —           | —           | —            |
| <b>Noselite</b><br>W. 342, Dl. 2 (2)        | 3NaAlSiO <sub>4</sub> · Na <sub>2</sub> SO <sub>4</sub>   | Is          | 2.30        | 1.495        |
| <b>Nouméite</b><br>W. 229, Dl. 2 (1)        | = Garnierite  | —           | —           | —            |
| <b>Ochrolite</b><br>D. 674, Dl. 3 (1)       | 2PbCl <sub>2</sub> · 4PbO · Sb <sub>2</sub> O <sub>3</sub>  | Or          | ?           | ?            |
| <b>Octahedrite</b><br>D. 252, W. 55         | TiO <sub>2</sub>  | Tt          | 3.90        | 2.56, 2.49   |
| <b>Octophyllite</b><br>W. 366, MA. 3        | Sub-group of Micas = Biotite  | —           | —           | —            |

A KEY TO MINERAL GROUPS, SPECIES AND VARIETIES 55

| <i>Name and Reference.</i>              | <i>Composition.</i>   | <i>Cr.</i> | <i>G.</i> | <i>N.</i>    |
|---|---|------------|-----------|--------------|
| <b>Oellacherite</b><br>D. 458, DL 2 (2) | Barium-bearing var. of Muscovite  | Mc         | 2.89      | ?            |
| <b>Okenite</b><br>D. 433, W. 231        | $H_2Ca(SiO_3)_2 \cdot H_2O$   | Tc         | 2.30      | 1.515, 1.512 |
| <b>Okermanite</b><br>W. 268, AJS. 1924  | $Ca_2MgSi_2O_7$   | Tt         | 3.20      | 1.639, 1.633 |
| <b>Oldhamite</b><br>D. 64, H. 1 (1)     | CaS   | Is         | 2.45      | ?            |
| <b>Oligoclase</b><br>D. 317, W. 320     | Calcareous var. of Albite, $Ab_9An_1$<br>to $Ab_7An_3$  | Te         | 2.65      | 1.546, 1.539 |
| <b>Oligonite</b><br>W. 78, H. 1 (3)     | $FeMn(CO_3)_2$  | Hx         | 3.90      | 1.839, 1.611 |
| <b>Olivenite</b><br>D. 561, W. 131      | (1) $Cu_2(OH)AsO_4$<br>(2) Group name incl. Adamite, Descloizite, Higginsite, Libethenite, Pyrobelonite, Tangéite | Or         | 4.25      | 1.84, 1.75   |
| <b>Olivine</b><br>D. 376, W. 166        | (1) Ferrug. var. of Forsterite<br>(2) Group name incl. Fayalite, Forsterite, Monticellite, Tephroite, etc.        | Or         | 3.35      | 1.680, 1.645 |
| <b>Omphacite</b><br>D. 325, W. 185      | = Diopside  | —          | —         | —            |
| <b>Onofrite</b><br>D. 61, DL 4 (1)      | Seleniferous var. of Cinnabar or Metacinnabarite  | ?          | 8.0       | Op           |
| <b>Onyx</b><br>D. 210, BPS.             | Banded ornamental var. of Chalcedony  | —          | —         | —            |
| <b>Opal</b><br>D. 212, W. 59            | $nSiO_2 \cdot H_2O$   | Am         | 2.1       | 1.41-1.46    |
| <b>Orangite</b><br>DL 3 (1), D. 395     | Var. of Thorite, bearing $UO_3$   | —          | —         | —            |
| <b>Orientite</b><br>W. 351, MA. 1       | $Ca_4Mn^{++}_2Si_2O_{18} \cdot 4H_2O$   | Or         | 3.05      | 1.795, 1.758 |
| <b>Orpiment</b><br>D. 27, DL 4 (1)      | $As_2S_3$   | Mc         | 3.50      | 3.0, 2.4     |
| <b>Orthite</b><br>D. 409, W. 358        | = Allanite  | —          | —         | —            |
| <b>Orthoclase</b><br>D. 313, W. 320     | $KAlSi_3O_8$ *  | Mc         | 2.55      | 1.525, 1.518 |
| <b>Orustite</b><br>DL 4 (1), MA. 1      | Mixt. of Tetradymite and Native Bismuth   | —          | —         | —            |
| <b>Osannite</b><br>MT., DAp. 2          | = Riebeckite  | —          | —         | —            |
| <b>Osmiridium</b><br>D. 22, H. 1        | $Os_2Ir$ . See Nevvianskite and Siserskite  | Hx         | 19 to 21  | Op           |

\* Medium temperature form, cf. Sanidine and Microcline.

## 56 A KEY TO MINERAL GROUPS, SPECIES AND VARIETIES

| <i>Name and Reference.</i>                 | <i>Composition.</i>  | <i>Cr.</i> | <i>G.</i> | <i>N.</i>    |
|--|--|------------|-----------|--------------|
| <b>Ottrelite</b><br>D. 467, W. 385         | Manganiferous var. of Chloritoid   | Tc         | 3.55      | 1.735, 1.725 |
| <b>Ouvarovite</b><br>D. 370, W. 263        | = Uvarovite  | —          | —         | —            |
| <b>Owyheeite</b><br>D. 4 (1), MA. 1        | $\text{Ag}_2\text{Pb}_5\text{Sb}_6\text{S}_{15}$   | Or ?       | ?         | Op           |
| <b>Oxalite</b><br>W. 90, Dl. 4 (3)         | = Humboldtine  | —          | —         | —            |
| <b>Oxammite</b><br>D. 822, W. 90           | $(\text{NH}_4)_2\text{C}_2\text{O}_4 \cdot \text{H}_2\text{O}$   | Or         | 1.43      | 1.595, 1.438 |
| <b>Pachnolite</b><br>D. 205, Dl. 4 (3)     | $\text{NaCaAlF}_6 \cdot \text{H}_2\text{O}$  | Mc         | 2.98      | 1.417, 1.409 |
| <b>Paigeite</b><br>DAp. 2, USPP.<br>158    | = Hulsite ?  | —          | —         | —            |
| <b>Palaite</b><br>W. 124, Dl. 3 (1)        | $\text{H}_2\text{Mn}''_5(\text{PO}_4)_4 \cdot 3\text{H}_2\text{O}$   | Mc         | 3.2       | 1.660, 1.652 |
| <b>Palladium</b><br>D. 23, Dl. 3 (2)       | Pd   | Is         | 11.5      | Op           |
| <b>Palmierite</b><br>W. 111, H. 1 (3)      | $\text{K}_2\text{Pb}(\text{SO}_4)_2$   | Hx         | 4.50      | 1.71         |
| <b>Palygorskite</b><br>Dl. 2 (2), RSWA. 13 | $\text{H}_4\text{Al}_2\text{Si}_2\text{O}_9 \cdot 2\text{H}_2\text{O} + \text{H}_4\text{MgSi}_3\text{O}_9 \cdot 2\text{H}_2\text{O}$ | Or         | 2.25      | 1.55         |
| <b>Pandermite</b><br>W. 95, H. 1 (4)       | = Priceite   | —          | —         | —            |
| <b>Paragonite</b><br>D. 459, Dl. 2 (2)     | $\text{H}_2\text{NaAl}_3(\text{SiO}_4)_3$  | Mc         | 2.90      | 1.615, 1.585 |
| <b>Parahopeite</b><br>W. 128, Dl. 3 (1)    | $\text{Zn}_3(\text{PO}_4)_2 \cdot 4\text{H}_2\text{O}$   | Tc         | 3.25      | 1.637, 1.614 |
| <b>Paralaurionite</b><br>W. 38, Dl. 4 (3)  | $\text{Pb}(\text{OH})\text{Cl}$  | Mc         | 6.10      | 2.15         |
| <b>Paraluminite</b><br>D. 794, H. 1 (3)    | $\text{Al}_4(\text{OH})_{10}\text{SO}_4 \cdot 10\text{H}_2\text{O}$  | ?          | 1.95      | 1.471, 1.462 |
| <b>Parasepiolite</b><br>W. 230, MT.        | Var. of Sepiolite or Palygorskite  | Or ?       | 2.0       | 1.511, 1.500 |
| <b>Paravauxite</b><br>W. 153, MA. 3        | $\text{Fe}''\text{Al}_2(\text{OH})_2(\text{PO}_4)_2 \cdot 4\text{H}_2\text{O}$   | Tc         | 2.30      | 1.573, 1.554 |
| <b>Pargasite</b><br>D. 338, W. 212         | Fluorine-bearing var. of Hornblende  | Mc         | 3.20      | 1.644, 1.624 |
| <b>Parisite</b><br>D. 284, H. 1 (3)        | $\text{CaCe}_2\text{F}_2(\text{CO}_3)_3$   | Hx         | 4.35      | 1.771, 1.672 |
| <b>Parsettensite</b><br>W. 221, MA. 2      | $\text{H}_6\text{Mn}''_3\text{Si}_4\text{O}_{14} \cdot \text{H}_2\text{O}$   | Hx ?       | 2.60      | 1.576, 1.546 |
| <b>Parsonsite</b><br>W. 145, MA. 3         | $2\text{PbO} \cdot \text{UO}_3 \cdot \text{P}_2\text{O}_5 \cdot \text{H}_2\text{O}$  | Mc         | 6.25      | 1.862, 1.850 |
| <b>Pascoeite</b><br>W. 156, Dl. 3 (1)      | $2\text{CaO} \cdot 3\text{V}_2\text{O}_5 \cdot 11\text{H}_2\text{O}$   | Mc         | 2.45      | 1.825, 1.775 |
| <b>Pateraite</b><br>H. 1 (2), Dl. 4 (3)    | $\text{CoMoO}_4$   | ?          | ?         | ?            |

| <i>Name and Reference.</i>                   | <i>Composition.</i>   | <i>Cr.</i> | <i>G.</i> | <i>N.</i>    |
|--|---|------------|-----------|--------------|
| <b>Paternoite</b><br>W. 94, MA. 1            | $MgB_8O_{13} \cdot 4H_2O$   | Or ?       | 2.10      | 1.47         |
| <b>Patronite</b><br>Dap. 2, Dl. 4 (1)        | $VS_4$ or $V_2S_5$  | ?          | ?         | ?            |
| <b>Pectolite</b><br>D. 330, W. 244           | $HNaCa_2(SiO_3)_3$  | Mc         | 2.80      | 1.638, 1.603 |
| <b>Peganite</b><br>D. 641, AM. 10            | = Variscite   | —          | —         | —            |
| <b>Penfieldite</b><br>W. 37, H. 1 (2)        | $Pb_3OCl_4$ (semi-artificial)   | Hx         | ?         | 2.21, 2.13   |
| <b>Penninite</b><br>D. 468, W. 376           | Aluminous var. of Antigorite,<br>$H_4Mg_3Si_2O_9 + H_4Mg_2Al_2SiO_9$            | Mc         | 2.70      | 1.585, 1.583 |
| <b>Penroseite</b><br>AM. 11, MA. 3           | $Ni_5Pb_2Cu_3Se_{17}$   | Or         | 6.95      | Op           |
| <b>Pentlandite</b><br>D. 65, Dl. 4 (1)       | $FeNiS_2$   | Is         | 4.7       | Op           |
| <b>Percylite</b><br>D. 192, H. 1 (2)         | $PbCu(OH)_2Cl_2$  | Is         | ?         | 2.05         |
| <b>Periclase</b><br>D. 225, W. 41            | MgO   | Is         | 3.65      | 1.7          |
| <b>Pericline</b><br>W. 283-5, D. 316         | Structural var. of Plagioclase  | —          | —         | —            |
| <b>Peristerite</b><br>D. 316, AM. 15         | Iridescent var. of Oligoclase   | —          | —         | —            |
| <b>Perovskite</b><br>D. 518, Dl. 3 (1)       | $CaTiO_3$   | Or         | 4.00      | 2.38         |
| <b>Perthite</b><br>D. 313, W. 280            | Parallel intergrowth of Orthoclase<br>and Albite                                | —          | —         | —            |
| <b>Petalite</b><br>D. 310, W. 276            | $LiAlSi_4O_{10}$  | Mc         | 2.40      | 1.516, 1.504 |
| <b>Petzite</b><br>D. 44, Dl. 4 (1)           | $Ag_3AuTe_2$  | Is         | 9.0       | Op           |
| <b>Phacolite</b><br>D. 447, Dl. 2 (3)        | Structural var. of Chabazite  | —          | —         | —            |
| <b>Pharmacolite</b><br>D. 617, W. 123        | $HCaAsO_4 \cdot 2H_2O$  | Mc         | 2.70      | 1.594, 1.583 |
| <b>Pharmacosiderite</b><br>D. 646, Dl. 3 (1) | $KFe'''_{10}(OH)_{10}(AsO_4)_7 \cdot 15H_2O$                                    | Mc ?       | 2.85      | 1.686, 1.681 |
| <b>Phenacite</b><br>D. 382, W. 163           | (1) $Be_2SiO_4$<br>(2) Group name incl. Diopase and<br>Willemite                | Hx         | 3.00      | 1.670, 1.654 |
| <b>Phengite</b><br>W. 361, MA. 3             | $H_4K_2(Mg, Fe)Al_4Si_7O_{24}$  | Mc         | 2.85      | 1.602, 1.556 |
| <b>Phillipsite</b><br>D. 441, W. 399         | $(K_4Ca_7Al_{18}Si_{22}O_{80} +$<br>$K_6Ca_5Al_{15}Si_{24}O_{80}) \cdot 35H_2O$ | Mc         | 2.20      | 1.50, 1.49   |

| <i>Name and Reference.</i>                    | <i>Composition.</i>  | <i>Cr.</i> | <i>G.</i> | <i>N.</i>    |
|---|--|------------|-----------|--------------|
| <b>Phlogopite</b><br>D. 462, W. 366           | $H_2KMg_3Al(SiO_4)_3$  | Mc         | 2.75      | 1.570, 1.540 |
| <b>Phoenicochroite</b><br>D. 726, H. 1 (3)    | $Pb_3O(CrO_4)_2$   | Or         | 5.75      | 2.65, 2.34   |
| <b>Pholidolite</b><br>D. 491, W. 372          | $H_{10}K_2Mg_{12}Al_2Si_{13}O_{47}$                                    | Mc         | 2.41      | 1.545, 1.503 |
| <b>Phosgenite</b><br>D. 286, H. 1 (3)         | $Pb_2Cl_2CO_3$   | Tt         | 6.15      | 2.145, 2.118 |
| <b>Phosphoferrite</b><br>AM. 13, ZK. 64       | $Fe''_3(PO_4)_2 \cdot 3H_2O$   | Or         | 3.15      | ?            |
| <b>Phosphophyllite</b><br>MA. 3, W. 124       | $Fe''Zn_2(PO_4)_2 \cdot 4H_2O$   | Mc         | 3.10      | 1.617, 1.595 |
| <b>Phosphosiderite</b><br>D. 609, ZK. 55      | $4Fe'''PO_4 \cdot 7H_2O$   | Mc         | 2.75      | 1.738, 1.692 |
| <b>Phosphuranylite</b><br>D. 664, W. 145      | $(UO_2)_3(PO_4)_2 \cdot 6H_2O$   | Mc         | ?         | 1.720, 1.691 |
| <b>Photocite</b><br>W. 196, MT.               | Mixture of alteration products of Rhodonite                            | —          | —         | —            |
| <b>Picite</b><br>W. 142, DL. 3 (1)            | $Fe'''_3(OH)_3(PO_4)_2 \cdot 6H_2O$                                    | Am         | 2.85      | 1.648        |
| <b>Pickeringite</b><br>D. 768, H. 1 (3)       | $MgAl_2(SO_4)_4 \cdot 22H_2O$  | Mc         | 1.85      | 1.483, 1.476 |
| <b>Picotite</b><br>D. 235, MM. 19             | Magnesian var. of Hercynite  | —          | —         | —            |
| <b>Picrochromite</b><br>W. 64, H. 1 (4)       | $MgCr_2O_4$  | Is         | 4.5       | ?            |
| <b>Picrocollite</b><br>MA. 3, RSWA. 13        | $H_4MgSi_3O_9 \cdot 2H_2O$ . Hypothetical end member of Pilolite Group | Or         | 2.1       | ?            |
| <b>Picroilmenite</b><br>W. 68, DL. 3 (1)      | Magnesian var. of Ilmenite   | Hx         | 4.3       | Op or AO     |
| <b>Picromerite</b><br>D. 760, W. 113          | $K_2Mg(SO_4)_2 \cdot 6H_2O$  | Mc         | 2.10      | 1.475, 1.460 |
| <b>Picropharmacolite</b><br>W. 125, DL. 3 (1) | $(Ca, Mg)_3(AsO_4)_2 \cdot 6H_2O$                                      | Mc         | 2.60      | 1.640, 1.631 |
| <b>Picrotephroite</b><br>W. 172, DL. 2 (1)    | Magnesian var. of Tephroite  | Or         | 3.7       | 1.74, 1.71   |
| <b>Picrotitanite</b><br>D. 233, MT.           | = Picroilmenite  | —          | —         | —            |
| <b>Piedmontite</b><br>D. 408, W. 358          | $H_2Ca_4Al_3Mn'''_3Si_6O_{26}$ *                                       | Mc         | 3.45      | 1.80, 1.75   |
| <b>Pigeonite</b><br>W. 181, DAp. 2            | Calcareous var. of Clinoenstatite                                      | Mc         | 3.3       | 1.74, 1.71   |
| <b>Pilbarite</b><br>DL. 2 (1), W. 52          | $PbThU^6Si_2O_{10} \cdot 4H_2O$  | Am         | 4.6       | 1.74         |
| <b>Pilolite</b><br>DL. 2 (2), MA. 3           | $nH_4MgSi_3O_9 \cdot 2H_2O + H_4Al_2Si_2O_8 \cdot 2H_2O$               | Or         | 2.10      | 1.51         |

\* Much so-called Piedmontite is only manganiferous Epidote.

A KEY TO MINERAL GROUPS, SPECIES AND VARIETIES 59

| <i>Name and Reference.</i>               | <i>Composition.</i>  | <i>Cr.</i> | <i>G.</i> | <i>N.</i>    |
|--|--|------------|-----------|--------------|
| <b>Pinakiole</b><br>H. 1 (4), W. 96      | $Mg_2Mn''BO_5$   | Or         | 3.90      | 2.065, 1.908 |
| <b>Pinite</b><br>D. 458, W. 275          | = Muscovite  | —          | —         | —            |
| <b>Pinnoite</b><br>D. 705, H. 1 (4)      | $H_4Mg(BO_3)_2 \cdot H_2O$   | Tt         | 2.28      | 1.575, 1.565 |
| <b>Pintadoite</b><br>DAp. 3, MT.         | $HCaVO_4 \cdot 4H_2O$  | ?          | ?         | ?            |
| <b>Pirssonite</b><br>W. 88, H. 1 (3)     | $Na_2Ca(CO_3)_2 \cdot 2H_2O$   | Or         | 2.35      | 1.575, 1.504 |
| <b>Pisanite</b><br>D. 753, H. 1 (3)      | $FeCu(SO_4)_2 \cdot 14H_2O$  | Mc         | 1.95      | 1.487, 1.472 |
| <b>Pistacite</b><br>W. 356, MT.          | = Epidote  | —          | —         | —            |
| <b>Pistomesite</b><br>D. 272, W. 77      | = Mesitite   | —          | —         | —            |
| <b>Pitchblende</b><br>D. 711, W. 69      | = Uraninite  | —          | —         | —            |
| <b>Pitticite</b><br>Dl. 3 (1), W. 121    | $Fe''_5(OH)_3(AsO_4)_4 \cdot 10H_2O$   | Am         | 2.48      | 1.63         |
| <b>Plagioclase</b><br>D. 316-320, W. 278 | Group name incl. Albite, Anorthite, Labradorite, etc.                              | —          | —         | —            |
| <b>Plagionite</b><br>D. 122, Dl. 4 (1)   | (1) $5PbS \cdot 4Sb_2S_3$<br>(2) Group name incl. Bismutoplagionite and Liveingite | Mc         | 5.50      | Op           |
| <b>Planchéite</b><br>W. 230, Dl. 2 (1)   | $2CuSiO_3 \cdot H_2O$  | Or         | 3.35      | 1.715, 1.645 |
| <b>Planerite</b><br>W. 142, Dl. 3 (1)    | $Al_3(OH)_3(PO_4)_2 \cdot 3H_2O$   | ?          | 2.65      | 1.522, 1.513 |
| <b>Platinum</b><br>D. 20, Dl. 3 (2)      | Pt( + Fe, Ir, etc.)  | Is         | 21-<br>16 | Op           |
| <b>Platinum iron</b><br>D. 20, H. 1 (1)  | $PtFe_2$   | Is         | 14-<br>15 | Op           |
| <b>Plattnerite</b><br>D. 251, ICT.       | $PbO_2$  | Tt         | 9.35      | 2.3          |
| <b>Platynite</b><br>Dl. 4 (1), DAp. 3    | $PbBi_2SSe_3$  | Hx         | 8.00      | Op           |
| <b>Plazolite</b><br>W. 266, MA. 1        | $Ca_3Al_2(Si, C)_2O_{10} \cdot 2H_2O$  | Is         | 3.15      | 1.710        |
| <b>Plenargyrite</b><br>Dl. 4 (1), MT.    | = Matildite  | —          | —         | —            |
| <b>Pleonaste</b><br>D. 234, W. 63        | = Ceylonite  | —          | —         | —            |
| <b>Plumbocalcite</b><br>W. 74, Dl. 1     | Lead-bearing var. of Calcite   | Hx         | 2.75      | 1.667, 1.490 |

## 60 A KEY TO MINERAL GROUPS, SPECIES AND VARIETIES

| <i>Name and Reference.</i>                | <i>Composition.</i>  | <i>Cr.</i>  | <i>G.</i> | <i>N</i>     |
|---|--|-------------|-----------|--------------|
| <b>Plumboferrite</b><br>H. 1(4), MA. 4    | $\text{PbFe}_4\text{O}_7$ or $(\text{Pb}, \text{Fe}''')\text{Fe}'''\text{O}_4$ | Hx          | 6.05      | Op           |
| <b>Plumbogummite</b><br>W. 149, DL. 3 (1) | $\text{PbAl}_3(\text{OH})_5(\text{PO}_4)_2 \cdot \text{H}_2\text{O}$           | Hx          | 4.5       | 1.675, 1.653 |
| <b>Plumbojarosite</b><br>W. 115, H. 1 (3) | $\text{PbFe}'''\text{O}_6(\text{OH})_{12}(\text{SO}_4)_4$                      | Hx          | 3.65      | 1.875, 1.784 |
| <b>Plumboniobite</b><br>DL. 3 (1), DAp. 3 | Lead-bearing var. of Samarskite  | Or          | 4.8       | ?            |
| <b>Plumbostannite</b><br>DL. 4 (1)        | = Franckéite   | —           | —         | —            |
| <b>Plumosite</b><br>DL. 4 (1), D. 130     | $\text{Pb}_2\text{Sb}_2\text{S}_5$   | Or          | 5.75      | Op           |
| <b>Podolite</b><br>W. 128, DL. 3 (1)      | $\text{Ca}_{10}(\text{CO}_3)(\text{PO}_4)_6 ?$                                 | Hx ?        | 3.10      | 1.639, 1.631 |
| <b>Polianite</b><br>D. 249, DL. 3 (2)     | $\text{MnO}_2$   | Tt          | 4.9       | Op           |
| <b>Pollucite</b><br>D. 322, W. 256        | $\text{H}_2(\text{Cs}, \text{Na})_2\text{Al}_2(\text{SiO}_3)_5$                | Is          | 2.90      | 1.525        |
| <b>Polyargyrite</b><br>D. 157, DL. 4 (1)  | $12\text{Ag}_2\text{S} \cdot \text{Sb}_2\text{S}_3$                            | Is          | 6.90      | Op           |
| <b>Polybasite</b><br>D. 156, DL. 4 (1)    | $9\text{Ag}_2\text{S} \cdot \text{Sb}_2\text{S}_3$                             | Or          | 6.20      | 2.72 or Op   |
| <b>Polycrase</b><br>D. 535, DL. 3 (1)     | $\text{YTi}_2\text{NbO}_8 + \text{Ti}_4\text{O}_9$                             | Or          | 5.0       | 1.70         |
| <b>Polydymite</b><br>D. 75, DL. 4 (1)     | $\text{Ni}_3\text{S}_4$  | Is          | 4.75      | Op           |
| <b>Polyhalite</b><br>D. 762, H. 1 (3)     | $\text{K}_2\text{MgCa}_2(\text{SO}_4)_4 \cdot 2\text{H}_2\text{O}$             | Tc          | 2.78      | 1.567, 1.548 |
| <b>Polyolithionite</b><br>W. 364, MA. 3   | $\text{H}_8\text{K}_2\text{Li}_4\text{Al}_2\text{Si}_5\text{O}_{22}$           | Mc          | 2.70      | 1.535        |
| <b>Polymignite</b><br>D. 533, DL. 3 (1)   | Ca, Ce, Zr, Ti, Nb, O  | Or          | 4.8       | 2.21         |
| <b>Polysphaerite</b><br>D. 550, H. 1 (4)  | Calcareous var. of Pyromorphite  | Hx          | 6.40      | ?            |
| <b>Potarite</b><br>MM. 21, AM. 13         | $\text{PdHg}$  | Is          | 15.5      | Op           |
| <b>Potassalumite</b><br>W. 114, H. 1 (3)  | $\text{KAl}(\text{SO}_4)_2 \cdot 12\text{H}_2\text{O}$ ; cf. Kalinite          | Is          | 1.76      | 1.456        |
| <b>Powellite</b><br>DL. 4 (3), W. 100     | $\text{CaMoO}_4$   | Tt          | 4.35      | 1.978, 1.967 |
| <b>Prasiolite</b><br>W. 275, MT.          | Chlorite pseudo. after Cordierite  | —           | —         | —            |
| <b>Prehnite</b><br>D. 411, W. 348         | $\text{H}_2\text{Ca}_2\text{Al}_3(\text{SiO}_4)_3$                             | Or          | 2.85      | 1.650, 1.617 |
| <b>Pribramite</b><br>MT. DL. 4 (1)        | Cadmiferous var. of Blende   | Is          | —         | —            |
| <b>Priceite</b><br>W. 95, H. 1 (4)        | $\text{Ca}_5\text{B}_{12}\text{O}_{23} \cdot 9\text{H}_2\text{O}$              | Tc or<br>Mc | 2.40      | 1.594, 1.572 |

A KEY TO MINERAL GROUPS, SPECIES AND VARIETIES 61

| <i>Name and Reference.</i>                 | <i>Composition.</i>  | <i>Cr.</i> | <i>G.</i> | <i>N.</i>    |
|--|--|------------|-----------|--------------|
| <b>Priorite</b><br>Dl. 3 (1), DAp. 2       | $YTi_2NbO_8(+CaTiNb_2O_8)$   | Or         | 5.0       | ?            |
| <b>Prismatite</b><br>Dl. 2 (2), W. 249     | Sodium-bearing var. of Kornerupite, $H_3NaMg_6(Al, B)_{12}Si_7O_{40}$                      | Or         | 3.30      | 1.683, 1.670 |
| <b>Probertite</b><br>AM. 14, USPP. 158     | $NaCaB_5O_9 \cdot 5H_2O$ *   | Mc         | 2.04      | 1.544, 1.515 |
| <b>Prochlorite</b><br>W. 376, D. 469       | = Ripidolite   | —          | —         | —            |
| <b>Prolectite</b><br>AM. 13, MA. 3         | = Chondrodite or Norbergite  | —          | —         | —            |
| <b>Prosopite</b><br>D. 204, Dl. 4 (3)      | $CaAl_2(F, OH)_8$  | Mc         | 2.87      | 1.510, 1.501 |
| <b>Protolithionite</b><br>W. 364, MA. 3    | $H_4K_2Fe_3Al_4Si_5O_{22}$   | Mc         | 2.98      | 1.63, 1.59   |
| <b>Proustite</b><br>D. 145, Dl. 4 (1)      | $Ag_3AsS_3$  | Hx         | 5.60      | 3.090, 2.793 |
| <b>Pseudoboléite</b><br>W. 36, Dl. 4 (3)   | $Pb_5Cu_4(OH)_8Cl_{10} \cdot 2H_2O$  | Tt         | 5.00      | 2.03, 2.00   |
| <b>Pseudobrookite</b><br>D. 246, MA. 3     | $Fe_2TiO_5$  | Or         | 4.70      | 2.40, 2.36   |
| <b>Pseudocotunnite</b><br>W. 33, H. 1 (2)  | $K_2PbCl_4$  | Or         | ?         | ?            |
| <b>Pseudoheterosite</b><br>W. 139          | = Heterosite ?   | —          | —         | —            |
| <b>Pseudoleucite</b><br>MA. 1, MT.         | Nepheline and Sanidine pseudomorphous after Leucite  | —          | —         | —            |
| <b>Pseudomalachite</b><br>D. 570, W. 134   | = Dihydrate, or possibly $Cu_5(OH)_4(PO_4)_2 \cdot H_2O$                                   | Mc         | 4.15      | 1.807, 1.730 |
| <b>Pseudomesolite</b><br>W. 405, MT.       | Optical var. of Mesolite   | —          | —         | —            |
| <b>Pseudowavellite</b><br>W. 152, AM. 15   | $Ca_5Al_{12}(OH)_{22}(PO_4)_8 \cdot 7H_2O$   | Hx         | 2.90      | 1.627, 1.620 |
| <b>Psilomelane</b><br>D. 269, Dl. 3 (2)    | $H_2O \cdot (H, K)_2O \cdot MnO \cdot 6MnO_2$  | Am         | 4.4       | Op           |
| <b>Psittacinite</b><br>D. 567, Ls., AM. 15 | = Cuprodescloizite or Mottramite   | —          | —         | —            |
| <b>Ptilolite</b><br>D. 436, W. 395         | $Na_3Ca_2Al_7Si_{33}O_{80} \cdot 25H_2O$   | Or         | 2.10      | 1.478, 1.475 |
| <b>Pucherite</b><br>D. 542, H. 1 (4)       | (1) $BiVO_4$<br>(2) Group name incl. Stibiotantalite, Stibiocolumbite and Bismutotantalite | Or         | 6.25      | 2.51, 2.41   |

\* Schaller, U.S. Geol. Surv. Prof. Paper 158, and Fashag, A. M. 16,339.



62 A KEY TO MINERAL GROUPS, SPECIES AND VARIETIES

| <i>Name and Reference.</i>                | <i>Composition.</i>   | <i>Cr.</i> | <i>G.</i> | <i>N.</i>    |
|---|---|------------|-----------|--------------|
| <b>Pufahlite</b><br>MA. 2, Dl. 4 (1)      | Zinkiferous var. of Teallite  | —          | —         | —            |
| <b>Pumpellyite</b><br>MA. 3, W. 352       | $H_8Ca_6Al_6Si_7O_{33}$   | Or         | 3.20      | 1.708, 1.698 |
| <b>Purpurite</b><br>W. 139, Dl. 3 (1)     | $2Mn^{IV}PO_4 \cdot H_2O$   | Or         | 3.40      | 1.92, 1.86   |
| <b>Pyralspite</b><br>W. 257, MM. 21       | Sub-group of Garnet incl. Pyrope,<br>Almandite, Spessartite   | —          | —         | —            |
| <b>Pyrargyrite</b><br>D. 144, Dl. 4 (1)   | $Ag_3SbS_3$   | Hx         | 5.85      | 3.084, 2.881 |
| <b>Pyrite</b><br>D. 85, Dl. 4 (1)         | (1) $FeS_2$<br>(2) Group name incl. Chloanthite,<br>Cobaltite, Gersdorffite, Haue-<br>rite, Sperryllite, etc. | Is         | 5.00      | Op           |
| <b>Pyroaurite</b><br>D. 267, W. 89        | $6MgO \cdot Fe_2O_3 \cdot CO_2 \cdot 12H_2O$  | Hx         | 2.07      | 1.565, 1.555 |
| <b>Pyrobelonite</b><br>W. 132, H. 1 (4)   | $PbMn(OH)VO_4$  | Or         | 5.40      | ?            |
| <b>Pyrochlore</b><br>D. 520, Dl. 3 (1)    | $NaCaFNb_2O_6 (+ NaCeFTiNbO_6)$   | Is         | 4.3       | 2.0          |
| <b>Pyrochroite</b><br>D. 263, Dl. 3 (2)   | $Mn(OH)_2$  | Hx         | 3.25      | 1.728, 1.686 |
| <b>Pyrolusite</b><br>D. 254, H. 1 (2)     | $MnO_2$   | Or ?       | 4.7       | Op           |
| <b>Pyromorphite</b><br>D. 550, H. 1 (4)   | $Pb_5Cl(PO_4)_3$  | Hx         | 7.00      | 2.061, 2.049 |
| <b>Pyrope</b><br>D. 370, W. 262           | $Mg_3Al_2(SiO_4)_3$   | Is         | 3.55      | 1.710        |
| <b>Pyrophanite</b><br>W. 69, Dl. 3 (1)    | $MnTiO_3$   | Hx         | 4.55      | 2.48, 2.21   |
| <b>Pyrophyllite</b><br>D. 497, W. 238     | $HAl(SiO_3)_2$  | Or         | 2.70      | 1.600, 1.552 |
| <b>Pyrorthite</b><br>D. 409, H. 2         | Mixt. of Allanite and Bitumen   | —          | —         | —            |
| <b>Pyrosmalite</b><br>D. 385, W. 220      | $H_7Fe_5Cl(SiO_4)_4$  | Hx         | 3.10      | 1.678, 1.641 |
| <b>Pyrostilpnite</b><br>D. 146, Dl. 4 (1) | (1) $Ag_3SbS_3$<br>(2) Group name incl. Stylotypite,<br>Xanthoconite, etc.                                    | Mc         | 5.8 ?     | AO           |
| <b>Pyroxene</b><br>D. 325, W. 172         | Group name incl. Acmite, Augite,<br>Diopside, Enstatite, etc.   | —          | —         | —            |
| <b>Pyroxmangite</b><br>W. 195, DAp. 3     | $(Fe, Mn)SiO_3$   | Tc         | 3.80      | 1.76, 1.75   |
| <b>Pyrrhite</b><br>W. 159, Dl. 3 (1)      | = Microlite or Pyrochlore   | —          | —         | —            |

A KEY TO MINERAL GROUPS, SPECIES AND VARIETIES 63

| <i>Name and Reference.</i>                 | <i>Composition.</i>   | <i>Cr.</i>  | <i>G.</i> | <i>N.</i>    |
|--|---|-------------|-----------|--------------|
| <b>Pyrrhotite</b><br>D. 74, Dl. 4 (1)      | $\text{Fe}_7\text{S}_8$ (or $\text{Fe}_3\text{S}_4$ )                                     | Hx *        | 4.65      | Op           |
| <b>Quartz</b><br>D. 210, H. 1 (2)          | $\text{SiO}_2$  | Hx          | 2.65      | 1.554, 1.545 |
| <b>Quenselite</b><br>MA. 3, MT.            | $2\text{PbO} \cdot \text{Mn}_2\text{O}_3 \cdot \text{H}_2\text{O}$                        | Mc          | 6.85      | Op           |
| <b>Quenstedtite</b><br>D. 773, Ls. 61      | = Copiapite   | —           | —         | —            |
| <b>Quercyite</b><br>MA. 3, LF. 4           | ? Mixt. of Collinsite and Collophanite ?  |             | 3.05      | 1.626        |
| <b>Quetenite</b><br>D. 804, W. 116         | $\text{MgFe}''_2(\text{OH})_2(\text{SO}_4)_3 \cdot 12\text{H}_2\text{O}$                  | Mc          | 2.12      | 1.582, 1.530 |
| <b>Racewinite</b><br>W. 352, MM. 18        | $\text{CaO} \cdot 5\text{Al}_2\text{O}_3 \cdot 12\text{SiO}_2 \cdot 20\text{H}_2\text{O}$ | ?           | 1.95,     | 1.51, 1.50   |
| <b>Radiophyllite</b><br>BSF. 52, MA. 2     | $\text{CaSiO}_3 \cdot \text{H}_2\text{O}$   | Tt or<br>Hx | 2.53      | ?            |
| <b>Rafaelite</b><br>W. 38, MM. 21          | = Paralaurionite  | —           | —         | —            |
| <b>Raimondite</b><br>D. 789, Ls. 125       | = Jarosite or Plumbojarosite  | Hx          | —         | —            |
| <b>Ralstonite</b><br>D. 208, W. 35         | $\text{NaMgAl}_4\text{F}_{15} \cdot 2\text{H}_2\text{O}$                                  | Is          | 2.60      | 1.427        |
| <b>Rammelsbergite</b><br>D. 100, Dl. 4 (1) | $\text{NiAs}_2$   | Or          | 7.15      | Op           |
| <b>Ramsayite</b><br>W. 163, MA. 3          | $\text{Na}_2\text{Ti}_2\text{Si}_2\text{O}_9$   | Or          | 3.45      | 1.9          |
| <b>Randite</b><br>MT., H. 1 (3)            | Ca, U, $\text{CO}_3$ , $\text{H}_2\text{O}$ (doubtful species).                           | —           | —         | —            |
| <b>Ranite</b><br>MT.                       | = Hydronephelite  | —           | —         | —            |
| <b>Ransomite</b><br>H. 1 (3), MM. 21       | $\text{CuFe}''_2(\text{SO}_4)_4 \cdot 7\text{H}_2\text{O}$                                | Or          | 2.63      | 1.695, 1.631 |
| <b>Rasorite</b><br>MA. 4, MT.              | = Kernite   | —           | —         | —            |
| <b>Raspite</b><br>W. 103, Dl. 4 (2)        | $\text{PbWO}_4$   | Mc          | ?         | 2.30, 2.27   |
| <b>Rathite</b><br>Dl. 4 (1), DAp. 2        | $\text{Pb}_3\text{As}_4\text{S}_9$  | Or          | 5.35      | Op           |
| <b>Rauvite</b><br>AM. 10, MT.              | $\text{CaO} \cdot 2\text{UO}_3 \cdot 6\text{V}_2\text{O}_5 \cdot 20\text{H}_2\text{O}$    | Am          | ?         | 1.88         |
| <b>Realgar</b><br>W. 22, D. 4 (1)          | AsS   | Mc          | 3.55      | 2.61, 2.46   |
| <b>Reddingite</b><br>D. 594, Dl. 3 (1)     | $\text{Mn}''_3(\text{PO}_4)_2 \cdot 3\text{H}_2\text{O}$                                  | Or          | 3.15      | 1.682, 1.652 |
| <b>Redingtonite</b><br>H. 1 (3), Dl. 4 (2) | $\text{Fe}''\text{Cr}_2(\text{SO}_4)_4 \cdot 21\text{H}_2\text{O}$                        | Tc ?        | 1.76      | ?            |

\* An orthorhombic mineral has been described as  $\alpha$  Pyrrhotite.

| <i>Name and Reference.</i>                  | <i>Composition.</i>  | <i>Cr.</i>  | <i>G.</i> | <i>N.</i>    |
|---|--|-------------|-----------|--------------|
| <b>Regnolite</b><br>Dl. 4 (1), MT.          | $Cu_5FeZnAs_2S_{12}$   | Is          | ?         | Op           |
| <b>Reinite</b><br>D. 819, Dl. 4 (2)         | $FeWO_4$ . Perhaps pseudom. of<br>Ferberite after Scheelite                    | Tt          | 7.05      | AO.          |
| <b>Remingtonite</b><br>D. 304, Dl. 1        | $Co_3(OH)_4CO_3$ (doubtful species).   | ?           | ?         | ?            |
| <b>Renardite</b><br>BSF. 51, MA. 4          | $PbO \cdot 4UO_3 \cdot P_2O_5 \cdot 9H_2O$                                     | Or          | 4.05      | 1.739, 1.715 |
| <b>Reniforite</b><br>MA. 3, AM. 11          | $5PbS \cdot As_2S_3$ . Perhaps impure<br>Jordanite                             | Or          | 6.45      | Op           |
| <b>Rennselaerite</b><br>D. 484, MT.         | Talc in massive waxy form  | —           | —         | —            |
| <b>Retzianite</b><br>W. 150, Dl. 3 (1)      | Y, Mn, Ca, $AsO_4$ , $H_2O$  | Or          | 4.15      | 1.800, 1.777 |
| <b>Reyerite</b><br>W. 226, DAp. 2           | Ca, Na, Al, $SiO_3$ , $H_2O$   | Hx          | 2.55      | 1.564, 1.559 |
| <b>Rezbanyite</b><br>D. 113, Dl. 4 (1)      | $4PbS \cdot 5Bi_2S_3$ . Perhaps =<br>Chiviatite                                | ?           | 6.10      | Op           |
| <b>Rhabdite</b><br>D. 25, H. 1              | Prismatic form of Schreibersite  | —           | —         | —            |
| <b>Rhabdophanite</b><br>D. 605, W. 137      | $(La, Y)PO_4 \cdot H_2O$   | Tt or<br>Hx | 4.0       | 1.703, 1.654 |
| <b>Rhagite</b><br>D. 667, Dl. 3 (1)         | $Bi_5(OH)_9(AsO_4)_2$  | Tt?         | 6.80      | ?            |
| <b>Rhodizite</b><br>LF. 5, W. 95            | $(Na, Cs, Rb)_2O \cdot 7BeO \cdot$<br>$3Al_2O_3 \cdot 7B_2O_3$                 | Is          | 3.15      | 1.693        |
| <b>Rhodocrosite</b><br>D. 274, W. 79        | $MnCO_3$   | Hx          | 3.70      | 1.818, 1.595 |
| <b>Rhodolite</b><br>W. 261, Dl. 2 (2)       | Ferruginous var. of Pyrope   | Is          | 3.80      | 1.750        |
| <b>Rhodonite</b><br>D. 335, W. 195          | (1) $MnSiO_3$<br>(2) Group name incl. Pyroxman-<br>gite, Sobralite and Vogtite | Tc          | 3.50      | 1.740, 1.727 |
| <b>Rhodophosphite</b><br>H. 1 (4), DAp. 1   | Manganiferous var. of Chlorapatite   | Hx          | —         | —            |
| <b>Rhodusite</b><br>ZK. 68R. Dl. 2<br>(1)   | $H_2Na_2Mg_3Fe'''_2(SiO_3)_8$  | Mc          | 3.15      | 1.690, 1.674 |
| <b>Rhoenite</b><br>W. 217, Dl. 2 (1)        | $H_2Ca_2(Mg, Fe)_3(Al, Fe)_4(Si, Ti)_6O_{24}$                                  | Tc          | 3.60      | ?            |
| <b>Rhomboclasite</b><br>H. 1 (3), Dl. 4 (2) | $H_2Fe'''_2(SO_4)_4 \cdot 8H_2O$   | Or          | 2.17      | 1.635, 1.533 |
| <b>Richmondite</b><br>Dl. 3 (1), MA. 1      | Mixt. of Evansite ? and Gibbsite   | —           | —         | —            |

| <i>Name and Reference.</i>              | <i>Composition.</i>                                    | <i>Cr.</i> | <i>G.</i> | <i>N.</i>    |
|---|--|------------|-----------|--------------|
| <b>Richterite</b><br>D. 338, W. 205     | Mn and Na-bearing var. of Kupfferite                   | Mc         | 3.05      | 1.636, 1.615 |
| <b>Rickardite</b><br>Dl. 4 (1), DAp. 2  | $Cu_4Te_3$   | ?          | 7.55      | Op           |
| <b>Riebeckite</b><br>D. 340, MA. 4      | $H_2Na_2Fe''_3Fe'''_2(SiO_3)_8$                        | Mc         | 3.35      | 1.697, 1.693 |
| <b>Rinkite</b><br>D. 517, W. 251        | $Na_2Ca_3CeF_3(Ti, Zr)(SiO_4)_3$                       | Mc         | 3.45      | 1.691, 1.665 |
| <b>Rinkolite</b><br>MA. 3, AM. 14       | Optical var. of Rinkite                                | Mc         | 3.40      | 1.666, 1.652 |
| <b>Rinnéite</b><br>W. 33, Dl. 4 (2)     | $NaK_3Fe''Cl_6$  | Hx         | 2.35      | 1.589, 1.588 |
| <b>Rionite</b><br>D. 149, Dl. 4 (1)     | Bi-bearing var. of Tennantite                          | Is         | 4.95      | Op           |
| <b>Ripidolite</b><br>W. 376, D. 469     | Var. of Chlorite midway bet. Amesite and Daphnite      | Mc         | 2.95      | 1.612, 1.608 |
| <b>Risoerite</b><br>ZK. 72, W. 159      | Titaniferous var. of Fergusonite                       | Tt         | 4.2       | 2.1          |
| <b>Rittingerite</b><br>D. 147, W. 4 (1) | = Xanthoconite   | —          | —         | —            |
| <b>Rivaite</b><br>DAp. 3, MA. 1         | $Na_2Ca_2Si_6O_{15}$                                   | Mc         | 2.55      | ?            |
| <b>Riversidite</b><br>W. 227, MA. 1     | $2CaSiO_3 \cdot H_2O$                                  | Or         | 2.64      | 1.603, 1.595 |
| <b>Roebbingite</b><br>W. 406, DAp. 1    | $7CaO \cdot 2PbO \cdot 2SO_3 \cdot 5SiO_2 \cdot 5H_2O$ | Or         | 3.45      | 1.66, 1.64   |
| <b>Roemerite</b><br>D. 778, H. 1 (3)    | $Fe''Fe'''_2(SO_4)_4 \cdot 14H_2O$                     | Tc         | 2.15      | 1.583, 1.524 |
| <b>Roepperite</b><br>D. 274             | (1) = Manganocalcite (D)                               | Hx         | 3.05      | 1.69, 1.50   |
| W. 171, Dl. 2 (1)                       | (2) Zinkiferous var. of Knebelite (W. & DL.)           | Or         | 4.00      | 1.804, 1.758 |
| <b>Roesslerite</b><br>Dl. 3 (1), MT.    | $HMgAsO_4 \cdot 7H_2O$                                 | Mc         | 1.95      | ?            |
| <b>Romanechite</b><br>LF. 4, Dl. 3 (2)  | $H_2O \cdot (H, K)_2O \cdot BaO \cdot 6MnO_2$          | Am ?       | 4.3       | Op           |
| <b>Roméite</b><br>D. 671, Dl. 3 (1)     | $CaSb_2O_4$ or $3CaO \cdot Sb_2O_3 \cdot Sb_2O_5$      | Tt         | 4.70      | 1.85         |
| <b>Rosasite</b><br>W. 86, MA. 2         | Probably = Aurichalcite                                | —          | —         | —            |
| <b>Roscherite</b><br>W. 153, Dl. 3 (1)  | $CaMnAl(OH)(PO_4)_2 \cdot 2H_2O$                       | Mc         | 2.90      | 1.625        |
| <b>Roscoelite</b><br>D. 463, W. 364     | $H_2KAl_2V(SiO_4)_3$                                   | Mc         | 2.97      | 1.698, 1.612 |
| <b>Roselite</b><br>W. 127, Dl. 3 (1)    | $Ca_2Co(AsO_4)_2 \cdot 2H_2O$                          | Tc         | 3.55      | 1.73, 1.72   |
| <b>Rosenbuschite</b><br>D. 331, W. 245  | $Na_2Ca_2(Si, Zr, Ti)_4O_{12}$                         | Mc         | 3.30      | 1.711, 1.682 |

| <i>Name and Reference.</i>              | <i>Composition.</i>  | <i>Cr.</i> | <i>G.</i> | <i>N.</i>    |
|---|--|------------|-----------|--------------|
| <b>Rosieresite</b><br>W. 142, DL. 3 (1) | Al, Pb, Cu, PO <sub>4</sub> , H <sub>2</sub> O   | Am         | 2.20      | 1.50         |
| <b>Rossite</b><br>AM. 13, MA. 3         | H <sub>4</sub> Ca(VO <sub>4</sub> ) <sub>2</sub> · 2H <sub>2</sub> O   | Tc         | 2.45      | 1.840, 1.710 |
| <b>Rosterite</b><br>D. 344, MA. 4       | Cæsium-bearing var. of Beryl.  | Hx         | 2.75      | 1.60, 1.59   |
| <b>Rowlandite</b><br>W. 245, DL. 2 (2)  | Fe(Y, Ce) <sub>4</sub> F <sub>2</sub> Si <sub>4</sub> O <sub>14</sub>  | Is         | 4.50      | 1.725        |
| <b>Rubiesite</b><br>DL. 4 (1)           | Sb and Se-bearing var. of Bismuthinite   | —          | —         | —            |
| <b>Ruby</b><br>D. 231, BPS.             | Red Corundum of gem quality  | —          | —         | —            |
| <b>Rumpfite</b><br>W. 380, D. 479       | = Corundophilite   | —          | —         | —            |
| <b>Rutherfordite</b><br>W. 88, H. 1 (3) | UO <sub>2</sub> CO <sub>3</sub>  | Or         | 4.80      | 1.80, 1.72   |
| <b>Rutile</b><br>D. 250, DL. 3 (1)      | (1) TiO <sub>2</sub><br>(2) Group name incl. Cassiterite, Plattnerite, Polianite, Ixiolite, Mossite, Tapiolite, etc. | Tt         | 4.25      | 2.89, 2.61   |
| <b>Safflorite</b><br>D. 99, DL. 4 (1)   | CoAs <sub>2</sub>  | Or         | 7.10      | Op           |
| <b>Sagenite</b><br>D. 250, H. 1 (2)     | Net-like form of Rutile  | —          | —         | —            |
| <b>Salammonite</b><br>D. 168, W. 30     | NH <sub>4</sub> Cl   | Is         | 1.51      | 1.642        |
| <b>Salite</b><br>W. 183, H. 2           | (1) Ferruginous var. of Diopside (D) *<br>(2) Magnesian var. of Hedenbergite (W)                                     | Mc         | 3.35      | 1.705, 1.677 |
| <b>Salmoite</b><br>AM. 12, MM. 20       | Zn, PO <sub>4</sub> (doubtful species).  | ?          | ?         | 1.695, 1.645 |
| <b>Salmonsite</b><br>W. 152, DL. 3 (1)  | Mn'' <sub>9</sub> Fe''' <sub>2</sub> (PO <sub>4</sub> ) <sub>8</sub> · 14H <sub>2</sub> O                            | Or         | 2.90      | 1.670, 1.655 |
| <b>Salt</b><br>D. 166, DL. 4 (2)        | (1) NaCl<br>(2) Group name incl. Bromyrite, Cerargyrite, Marshite, Nantokite, Sylvite, etc.                          | Is         | 2.17      | 1.545        |
| <b>Saltpetre</b><br>D. 684, H. 1 (3)    | = Nitre  | —          | —         | —            |
| <b>Samarskite</b><br>D. 529, H. 1 (4)   | Y <sub>2</sub> Nb <sub>2</sub> O <sub>8</sub> + Fe''U <sup>4</sup> Nb <sub>2</sub> O <sub>8</sub>                    | Or         | 5.7       | 2.2          |

\* Original definition, see Dana, 5th edition, p. 217.

| <i>Name and Reference.</i>               | <i>Composition.</i>   | <i>Cr.</i> | <i>G.</i> | <i>N.</i>    |
|--|---|------------|-----------|--------------|
| <b>Samiresite</b><br>W. 159, DL 3 (1)    | $2\text{UO}_3 \cdot \text{PbO} \cdot 2\text{TiO}_2 \cdot 5\text{Nb}_2\text{O}_5 \cdot 17\text{H}_2\text{O}$ | Is         | 5.25      | 1.94         |
| <b>Samoite</b><br>AM. 10, DL 2 (2)       | $\text{Al}_4(\text{SiO}_4)_3 \cdot 10\text{H}_2\text{O}$ (doubtful species).                                | Am         | ?         | ?            |
| <b>Samsonite</b><br>DL 4 (1), DAp. 3     | $\text{Ag}_4\text{MnSb}_2\text{S}_6$  | Mc         | ?         | Op           |
| <b>Sandbergerite</b><br>DL 4 (1), MT.    | Zinkiferous var. of Tennantite  | —          | —         | —            |
| <b>Sanidine</b><br>W. 312-3, DL 2 (2)    | $\text{KAlSi}_3\text{O}_8$ *  | Mc         | 2.57      | 1.517, 1.524 |
| <b>Saponite</b><br>D. 488, DL 2 (1)      | $\text{H}_8\text{Mg}_2\text{Si}_3\text{O}_{12} + \text{H}_8\text{MgAl}_2\text{Si}_2\text{O}_{12}$ ?         | Mc ?       | 2.25      | 1.56, 1.55   |
| <b>Sapphire</b><br>D. 231, BPS.          | Blue Corundum of gem quality  | —          | —         | —            |
| <b>Sapphirine</b><br>D. 430, W. 277      | $\text{Mg}_6(\text{Al, B})_{12}\text{Si}_2\text{O}_{27}$  | Mc         | 3.50      | 1.720, 1.715 |
| <b>Sarcolite</b><br>D. 390, AM. 14       | $\text{Ca}_2\text{Al}_2\text{SiO}_7 + \text{CaSi}_3\text{O}_7$  | Tt         | 2.55      | 1.636, 1.622 |
| <b>Sarcopsidite</b><br>W. 152, DL 3 (1)  | $(\text{Fe, Mn, Ca})_7\text{F}_2(\text{PO}_4)_4$  | Mc         | 3.70      | 1.725        |
| <b>Sardonyx</b><br>D. 210, BPS.          | Banded red and white Chalcedony   | —          | —         | —            |
| <b>Sarkinite</b><br>W. 133, DL 3 (1)     | $\text{Mn}''_2(\text{OH})\text{AsO}_4$  | Mc         | 4.10      | 1.802, 1.780 |
| <b>Sartorite</b><br>D. 115, DL 4 (1)     | = Scleroclasite   | —          | —         | —            |
| <b>Sassolite</b><br>D. 265, W. 49        | $\text{H}_3\text{BO}_3$   | Tc         | 1.48      | 1.459, 1.340 |
| <b>Saussurite</b><br>D. 406              | Mixt. of Zoisite and Albite   | —          | —         | —            |
| <b>Saynite</b><br>DL 4 (1), MT.          | Ni, Bi, S. Perhaps a mixture  | Is         | 5.15      | Op           |
| <b>Scacchite</b><br>DL 4 (3), ICT.       | $\text{MnCl}_2$   | Is         | 2.98      | ?            |
| <b>Scapolite</b><br>W. 345, DL 2 (2)     | Group name incl. Marialite, Mizzonite, Meionite, etc.   | —          | —         | —            |
| <b>Scawtite</b><br>MM. 22, AM. 15        | $6\text{CaO} \cdot 4\text{SiO}_2 \cdot 3\text{CO}_2$  | Mc         | 2.77      | 1.621, 1.598 |
| <b>Schafarzikite</b><br>W. 122, MA. 3    | $\text{Fe}''$ , P, O  | Tt         | 4.30      | 1.74 +       |
| <b>Schallerite</b><br>W. 405, AM. 10     | $9\text{MnSiO}_3 \cdot \text{Mn}_2(\text{AsO}_4)_2 \cdot 7\text{H}_2\text{O}$                               | Tt or Hx   | 3.35      | 1.704, 1.679 |
| <b>Schaphbachite</b><br>D. 129, DL 4 (1) | $\text{Ag}_2\text{PbBi}_2\text{S}_5$  | Or         | 6.45      | Op           |

\* High temperature form, cf. Orthoclase and Microcline.

| Name and Reference.                           | Composition.  | Cr.     | G.        | N.                |
|---|---|---------|-----------|-------------------|
| <b>Scheelite</b><br>Dl. 4 (2), W. 99          | (1) $\text{CaWO}_4$<br>(2) Group name incl. Cuprotungstite, Powellite, Stolzite and Wulfenite   | Tt<br>— | 6.10<br>— | 1.934, 1.918<br>— |
| <b>Schefferite</b><br>D. 325, Dl. 2 (1)       | Manganiferous var. of Diopside  | Mc      | 3.50      | ?                 |
| <b>Schertelite</b><br>DAp. 2, Dl. 3 (1)       | $\text{H}_2(\text{NH}_4)_2\text{Mg}(\text{PO}_4)_2 \cdot 4\text{H}_2\text{O}$   | ?       | ?         | ?                 |
| <b>Schirmerite</b><br>D. 125, Dl. 4 (1)       | $\text{Ag}_4\text{PbBi}_4\text{S}_9$  | Or      | 6.74      | Op                |
| <b>Schizolite</b><br>Dl. 2 (1), W. 245        | $\text{HNa}(\text{Ca}, \text{Mn})_2(\text{SiO}_3)_3$  | Tc      | 3.05      | 1.660, 1.631      |
| <b>Schneebergite</b><br>Dl. 3 (1), W. 155     | $\text{CaSb}_2\text{O}_4$ ? (doubtful species).   | Is      | 4.7       | 2.09              |
| <b>Schoenite</b><br>H. 1 (3), MT.             | = Picromerite   | —       | —         | —                 |
| <b>Schoepite</b><br>Dl. 4 (2), BSF.<br>49     | $\text{UO}_3 \cdot 2\text{H}_2\text{O}$   | Or      | 5.70      | 1.735, 1.690      |
| <b>Schorl (Schorlite)</b><br>D. 426, W. 246   | $\text{H}_5\text{NaFe}''_4\text{Al}_5\text{B}_4\text{Si}_8\text{O}_{41}$ or<br>$\text{H}_4\text{NaFe}''_3\text{Al}_6\text{B}_3\text{Si}_6\text{O}_{31}$ | Hx      | 3.15      | 1.67, 1.64        |
| <b>Schorlomite</b><br>Dl. 2 (2), W. 266       | $\text{Ca}_3(\text{Fe}''', \text{Ti})_2(\text{Si}, \text{Ti})_3\text{O}_{12}$   | Is      | 3.75      | 1.96              |
| <b>Schreibersite</b><br>D. 25, H. 1           | $\text{Fe}_3\text{P}$   | Tt      | 7.15      | Op                |
| <b>Schroeckerite</b><br>W. 88, H. 1 (3)       | $\text{U}^6, \text{Ca}, \text{CO}_3, \text{H}_2\text{O}$  | Mc      | ?         | 1.690, 1.658      |
| <b>Schroetterite</b><br>W. 241, Dl. 2 (2)     | $\text{Al}_6\text{SiO}_{11} \cdot n\text{H}_2\text{O}$  | Am      | 2.0       | 1.584             |
| <b>Schultenite</b><br>MM. 21, AM. 12          | $\text{HPbAsO}_4$   | Mc      | 5.95      | 1.976, 1.890      |
| <b>Schwartzembergite</b><br>D. 188, Dl. 4 (3) | $\text{Pb}(\text{IO}_3)_2 \cdot 3\text{Pb}_2\text{O}_2\text{Cl}_2$  | Or      | 7.4       | 2.36, 2.25        |
| <b>Schwartzite</b><br>Dl. 4 (1), AJS.<br>11   | $\text{Cu}_{10}(\text{Cu}, \text{Hg})_2\text{Sb}_4\text{S}_{13}$ (= Mercurial Tetrahedrite).  | Is      | 5.0       | Op                |
| <b>Scleroclasite</b><br>D. 115, Dl. 4 (1)     | $\text{PbAs}_2\text{S}_4$   | Or      | 5.35      | Op                |
| <b>Scolecite</b><br>D. 454, W. 396            | $\text{CaAl}_2\text{Si}_3\text{O}_{10} \cdot 3\text{H}_2\text{O}$   | Mc      | 2.30      | 1.517, 1.510      |
| <b>Scorodite</b><br>D. 607, W. 137            | (1) $\text{FeAsO}_4 \cdot 2\text{H}_2\text{O}$<br>(2) Group name incl. Barrandite, Strengite and Variscite  | Or      | 3.30      | 1.809, 1.779      |
| <b>Seamanite</b><br>AM. 15, MA. 4             | $6\text{MnO} \cdot \text{B}_2\text{O}_3 \cdot \text{P}_2\text{O}_5 \cdot 6\text{H}_2\text{O}$   | Or      | 3.15      | 1.665, 1.640      |
| <b>Searlesite</b><br>W. 251, Dl. 2 (3)        | $\text{NaB}(\text{SiO}_3)_2 \cdot \text{H}_2\text{O}$   | Mc      | 2.45      | 1.535, 1.513      |

| <i>Name and Reference.</i>               | <i>Composition.</i>   | <i>Cr.</i> | <i>G.</i> | <i>N.</i>    |
|--|---|------------|-----------|--------------|
| <b>Seebachite</b><br>Dl. 4 (1)           | Mixt. of Berzelianite, Clausthalite,<br>etc.  | —          | —         | —            |
| <b>Selenolite</b><br>Dl. 4 (1), MT.      | SeO <sub>2</sub>  | Mc         | ?         | ?            |
| <b>Selensulphur</b><br>D. 4, Dl. 4 (1)   | Seleniferous var. of sulphur  | Mc ?       | 2.38      | 2.04         |
| <b>Selentellurium</b><br>D. 6, Dl. 4 (1) | Se <sub>2</sub> Te <sub>3</sub>   | Hx         | 5.5       | Op           |
| <b>Seligmannite</b><br>Dl. 4 (1), MM. 15 | CuPbAsS <sub>3</sub>  | Or         | 5.50      | Op           |
| <b>Sellaite</b><br>D. 177, W. 32         | MgF <sub>2</sub>  | Tt         | 3.15      | 1.390, 1.378 |
| <b>Selwynite</b><br>D. 500, MT.          | Probably impure Fuchsite  | ?          | 2.53      | ?            |
| <b>Semseyite</b><br>D. 133, Dl. 4 (1)    | Pb <sub>9</sub> Sb <sub>8</sub> S <sub>21</sub>   | Mc         | 5.90      | Op           |
| <b>Senaite</b><br>W. 69, Dl. 3 (1)       | (Fe, Pb)(Ti, Mn)O <sub>3</sub> (+ Fe <sub>2</sub> O <sub>3</sub> )  | Hx         | 5.5       | 2.5          |
| <b>Senarmontite</b><br>D. 214, Dl. 3 (1) | Sb <sub>2</sub> O <sub>3</sub>  | Is         | 5.25      | 2.087        |
| <b>Sepiolite</b><br>D. 485, W. 230       | H <sub>4</sub> Mg <sub>2</sub> Si <sub>3</sub> O <sub>10</sub>  | Or ?       | 2.0       | 1.529, 1.519 |
| <b>Serendibite</b><br>W. 253, DAp. 2     | CaMg <sub>2</sub> Al <sub>3</sub> BSi <sub>2</sub> O <sub>13</sub>  | Tc         | 3.40      | 1.706, 1.701 |
| <b>Sericite</b><br>D. 458, W. 363        | Fine scaly form of Muscovite  | —          | —         | —            |
| <b>Serpentine</b><br>D. 481, W. 373      | = Antigorite  | —          | —         | —            |
| <b>Serpierite</b><br>D. 782, W. 104      | Zinkiferous var. of Brochantite   | Or         | 2.52      | 1.647, 1.584 |
| <b>Seybertite</b><br>D. 465, W. 384      | H <sub>2</sub> CaMgAl <sub>6</sub> O <sub>12</sub> + H <sub>2</sub> CaMg <sub>4</sub> Si <sub>3</sub> O <sub>12</sub> | Mc         | 3.10      | 1.658, 1.646 |
| <b>Shannonite</b><br>AM. 14, W. 165      | = Monticellite  | —          | —         | —            |
| <b>Shattuckite</b><br>W. 231, Dl. 2 (3)  | 2CuSiO <sub>3</sub> · H <sub>2</sub> O  | Mc         | 3.80      | 1.796, 1.730 |
| <b>Sheridanite</b><br>W. 380, MT.        | = Clinochlore   | —          | —         | —            |
| <b>Sicklerite</b><br>W. 154, Dl. 3 (1)   | H <sub>3</sub> Li <sub>3</sub> Mn'' <sub>6</sub> Fe''' <sub>2</sub> (PO <sub>4</sub> ) <sub>8</sub>                   | Or         | 3.45      | 1.745, 1.715 |
| <b>Siderite</b><br>D. 273, W. 78         | FeCO <sub>3</sub>   | Hx         | 3.90      | 1.875, 1.633 |
| <b>Sideronatrite</b><br>D. 799, H. 1 (3) | Na <sub>2</sub> Fe'''(OH)(SO <sub>4</sub> ) <sub>2</sub> · 3H <sub>2</sub> O  | Or ?       | 2.30      | 1.586, 1.504 |
| <b>Siderophyllite</b><br>W. 366, MA. 3   | H <sub>4</sub> K <sub>2</sub> Fe'' <sub>5</sub> Al <sub>4</sub> Si <sub>5</sub> O <sub>24</sub>                       | Mc         | 3.20      | 1.670, 1.616 |
| <b>Sideroplesite</b><br>W. 77, MT.       | Magnesian var. of Siderite  | —          | —         | —            |
| <b>Siderotilite</b><br>W. 108, H. 1 (3)  | FeSO <sub>4</sub> · 5H <sub>2</sub> O   | Tc         | 2.20      | 1.544, 1.528 |



## 70 A KEY TO MINERAL GROUPS, SPECIES AND VARIETIES

| <i>Name and Reference.</i>                | <i>Composition.</i>   | <i>Cr.</i> | <i>G.</i> | <i>N.</i>    |
|---|---|------------|-----------|--------------|
| <b>Siegenite</b><br>AM. 15, DL. 4 (1)     | Cobaltiferous var. of Polydymite  | Is         | 4.80      | Op           |
| <b>Sillimanite</b><br>D. 399, W. 233      | $\text{Al}_2\text{SiO}_5$   | Or         | 3.25      | 1.680, 1.659 |
| <b>Silver</b><br>D. 14, DL. 3 (2)         | Ag  | Is         | 10.4      | Op           |
| <b>Silverjamesonite</b><br>DL. 4 (1), MT. | = Owyheeite   | —          | —         | —            |
| <b>Silvestrite</b><br>H. 1 (1), DL. 3 (2) | $\text{Fe}_5\text{N}_2$   | ?          | 6.2       | Op           |
| <b>Sincosite</b><br>W. 143, MA. 2         | $\text{Ca}(\text{VO})_2(\text{PO}_4)_2 \cdot 5\text{H}_2\text{O}$   | Tt         | 2.85      | 1.680, 1.655 |
| <b>Sipylite</b><br>D. 524, DL. 3 (1)      | $\text{ErNbO}_4$ ? Probably = Fergusonite   | Tt         | 4.9       | 2.06         |
| <b>Siserskite</b><br>D. 22, H. 1          | Var. of Osmiridium with low Ir.   | Hx         | 20        | Op           |
| <b>Sismondine</b><br>W. 385, DL. 2 (3)    | Magnesian var. of Chloritoid  | —          | —         | —            |
| <b>Skemmatite</b><br>MT. DL. 3 (2)        | = Ferriferous psilomelane   | —          | —         | —            |
| <b>Skiagite</b><br>MA. 3, AM. 13          | Hypothetical $\text{Fe}''_3\text{Fe}'''_2(\text{SiO}_4)_3$ in Garnet  | —          | —         | —            |
| <b>Sklodovskite</b><br>BSF. 49, MA. 3     | $\text{MgO} \cdot 2\text{UO}_3 \cdot 2\text{SiO}_2 \cdot 7\text{H}_2\text{O}$   | Or         | ?         | 1.657, 1.613 |
| <b>Skutterudite</b><br>DL. 4 (1), MA. 3   | = Smaltite  | —          | —         | —            |
| <b>Slavikite</b><br>MA. 3, DL. 1 (3)      | = Natrojarosite   | —          | —         | —            |
| <b>Smaltite</b><br>D. 87, DL. 4 (1)       | $\text{CoAs}_2$   | Is         | 6.75      | Op           |
| <b>Smaragdite</b><br>D. 338, H. 2         | = Hornblende  | —          | —         | —            |
| <b>Smithite</b><br>DL. 4 (1), ICT.        | $\text{AgAsS}_2$  | Mc         | 4.80      | 2.60, 2.48   |
| <b>Smithsonite</b><br>D. 275, H. 1 (3)    | $\text{ZnCO}_3$   | Hx         | 4.35      | 1.849, 1.621 |
| <b>Sobralite</b><br>W. 195, DL. 2 (3)     | $\text{CaMgFe}''_2\text{Mn}''_4(\text{SiO}_3)_8$  | Tc         | 3.50      | 1.74         |
| <b>Sodaclase</b><br>W. 319, MM. 21        | = Albite  | —          | —         | —            |
| <b>Sodalite</b><br>D. 362, W. 342         | (1) $\text{Na}_4\text{Al}_3\text{Cl}(\text{SiO}_4)_3$<br>(2) Group name incl. Noselite, Hauynite, Lazurite, Helvite, Hackmanite, and Danalite | Is         | 2.25      | 1.485        |
| <b>Soda-melilite</b><br>AM. 14, MA. 4     | $\text{Na}_2\text{Si}_3\text{O}_7$ , hypothetical molecule in Melilite  | —          | —         | —            |

| <i>Name and Reference.</i>                 | <i>Composition.</i>   | <i>Cr.</i> | <i>G.</i>       | <i>N.</i>    |
|--|---|------------|-----------------|--------------|
| <b>Sodamicrocline</b><br>W. 292, 318       | Sodium-bearing var. of Microcline   | Tc         | 2.57            | 1.530, 1.523 |
| <b>Sodanitre</b><br>W. 90                  | = Nitratite or Natronitrite   | —          | —               | —            |
| <b>Soda-orthoclase</b><br>W. 292, 318      | Sodium-bearing var. of Orthoclase   | Mc         | 2.55            | 1.527, 1.519 |
| <b>Soda-sanidine</b><br>W. 316, 322        | Sodium-bearing var. of Sanadine   | Mc         | 2.58            | 1.526, 1.518 |
| <b>Soddite, Soddyite</b><br>BSF. 49, MA. 3 | $12\text{UO}_3 \cdot 5\text{SiO}_2 \cdot 14\text{H}_2\text{O}$                                      | Or         | 4.63            | 1.662        |
| <b>Soumansite</b><br>H. 1 (4), AM. 15      | = Wardite   | —          | —               | —            |
| <b>Spadaite</b><br>D. 487, H. 2            | $\text{H}_2\text{Mg}_5(\text{SiO}_3)_6 \cdot 3\text{H}_2\text{O}$                                   | ?          | 2.5             | 1.53         |
| <b>Spangolite</b><br>D. 732, H. 1 (3)      | $\text{Cu}_6\text{AlCl}(\text{OH})_{12}\text{SO}_4 \cdot 3\text{H}_2\text{O}$                       | Hx         | 3.15            | 1.694, 1.641 |
| <b>Spencerite</b><br>W. 135, MA. 1         | $\text{Zn}_4(\text{OH})_2(\text{PO}_4)_2 \cdot 3\text{H}_2\text{O}$                                 | Mc         | 3.15            | 1.602, 1.586 |
| <b>Sperryllite</b><br>D. 93, MM. 21        | $\text{PtAs}_2$   | Is         | 10.60           | Op           |
| <b>Spessartite</b><br>D. 370, W. 261       | $\text{Mn}''_3\text{Al}_2(\text{SiO}_4)_3$  | Is         | 4.20            | 1.800        |
| <b>Sphalerite</b><br>D. 58, W. 19          | = Blende  | —          | —               | —            |
| <b>Sphene</b><br>D. 510                    | = Titanite  | —          | —               | —            |
| <b>Sphenomanganite</b><br>Dl. 3 (2), MA. 1 | $\text{Mn}_2\text{O}_3 \cdot \text{H}_2\text{O}$ = Manganite ?                                      | Or         | 4.30            | Op           |
| <b>Spherite</b><br>D. 643, W. 142          | $\text{Al}_5(\text{OH})_9(\text{PO}_4)_2 \cdot 3\text{H}_2\text{O}$                                 | Or         | 2.55            | 1.588, 1.562 |
| <b>Sphero-cobaltite</b><br>D. 276, W. 80   | $\text{CoCO}_3$   | Hx         | 4.10            | 1.855, 1.600 |
| <b>Spinel</b><br>D. 234, H. 1 (4)          | (1) $\text{MgAl}_2\text{O}_4$<br>(2) Group name incl. Chromite, Gahnite, Hercynite, Magnetite, etc. | Is         | 3.55–<br>3.85 * | 1.72 to 1.90 |
| <b>Spodiophyllite</b><br>Dl. 2 (2), MT.    | $(\text{Na}, \text{K})_4\text{Mg}_3\text{Al}_2(\text{SiO}_3)_8$                                     | Hx ?       | 2.63            | ?            |
| <b>Spodiosite</b><br>D. 554, H. 1 (4)      | $\text{Ca}_2\text{FPO}_4$   | Or         | 2.95            | 1.700, 1.664 |
| <b>Spodumene</b><br>D. 327, Dl. 2 (2)      | $\text{LiAl}(\text{SiO}_3)_2$   | Mc         | 3.15            | 1.679, 1.659 |
| <b>Spurrite</b><br>W. 407, Dl. 2 (1)       | $5\text{CaO} \cdot \text{CO}_2 \cdot 2\text{SiO}_2$   | Mc         | 3.0             | 1.679, 1.640 |
| <b>Staffelite</b><br>W. 156, Dl. 3 (1)     | = Francolite  | —          | —               | —            |
| <b>Stainierite</b><br>MA. 4, BSF. 52       | $\text{Co}(\text{OH})\text{O}$  | Cryst.     | 4.30            | Op           |

\* G and N rise with increase of Fe displacing Mg.

| <i>Name and Reference.</i>                    | <i>Composition.</i>  | <i>Cr.</i> | <i>G.</i>   | <i>N.</i>         |
|---|--|------------|-------------|-------------------|
| <b>Stannite</b><br>D. 84, Dl. 4 (1)           | $\text{Cu}_2\text{FeSnS}_4$  | Tt         | 4.40        | Op                |
| <b>Stassfurtite</b><br>W. 96, MT.             | = Boracite   | —          | —           | —                 |
| <b>Staurolite</b><br>D. 428, W. 349           | $\text{HFe}''\text{Al}_5\text{Si}_2\text{O}_{13}$  | Or         | 3.75        | 1.756, 1.744      |
| <b>Steargillite</b><br>AM. 10, LF. 1          | $\text{H}_2\text{Al}_2\text{Si}_3\text{O}_{10}$ ? probably<br>= Montmorillonite  | Am         | ?           | ?                 |
| <b>Steatite</b><br>D. 484                     | = Talc   | —          | —           | —                 |
| <b>Steenstrupine</b><br>H. 2, MT.             | Na, Ce, Mn, $\text{Fe}'''$ , Th, Si, O, $\text{H}_2\text{O}$   | Hx         | 3.40        | ?                 |
| <b>Stellerite</b><br>W. 395, Dl. 2 (3)        | $\text{CaAl}_2\text{Si}_7\text{O}_{18} \cdot 7\text{H}_2\text{O}$  | Or         | 2.12        | 1.495, 1.484      |
| <b>Stelznerite</b><br>H. 1 (3), AJS. 1929     | = Antlerite  | —          | —           | —                 |
| <b>Stephanite</b><br>D. 153, Dl. 4 (1)        | $\text{Ag}_5\text{SbS}_4$  | Or         | 6.25        | Op                |
| <b>Stercorite</b><br>D. 615, Dl. 3 (1)        | $\text{HNaNH}_4\text{PO}_4 \cdot 4\text{H}_2\text{O}$  | Mc         | 1.57        | 1.469, 1.439      |
| <b>Sternbergite</b><br>D. 56, Dl. 4 (1)       | $\text{AgFe}_2\text{S}_3$  | Or         | 4.2 *       | Op                |
| <b>Stevensite</b><br>W. 245, MA. 1            | $\text{H}_2\text{Mg}_3(\text{SiO}_3)_4 \cdot \text{H}_2\text{O}$ (perhaps =<br>Talc).  | Am ?       | 2.17        | 1.5               |
| <b>Stewartite</b><br>W. 127, Dl. 3 (1)        | $\text{Mn}_3(\text{PO}_4)_2 \cdot 4\text{H}_2\text{O}$ ?   | Tc         | 2.95        | 1.69, 1.63        |
| <b>Stibiconite</b><br>D. 222, Dl. 3 (1)       | $\text{Sb}_2\text{O}_4 \cdot \text{H}_2\text{O}$   | Am ?       | 5.25        | 1.7               |
| <b>Stibiocolumbite</b><br>H. 1 (4), Dl. 3 (1) | $\text{SbNbO}_4$   | Or         | 5.7–<br>6.6 | 2.451, 2.398      |
| <b>Stibiopalladinite</b><br>MA. 4, AM. 15     | $\text{Pd}_3\text{Sb}$   | Is         | 9.5         | Op                |
| <b>Stibiotantalite</b><br>H. 1 (4), Dl. 3 (1) | $\text{SbTaO}_4$   | Or         | 6.6–<br>7.5 | 2.457, 2.374      |
| <b>Stibnite</b><br>D. 28, Dl. 3 (1)           | (1) $\text{Sb}_2\text{S}_3$<br>(2) Group name incl. Bismutite,<br>Guanajuatite, Orpiment   | Or         | 4.65        | AO. 4.30,<br>3.19 |
| <b>Stichtite</b><br>W. 89, H. 1 (3)           | $6\text{MgO} \cdot \text{Cr}_2\text{O}_3 \cdot \text{CO}_2 \cdot 12\text{H}_2\text{O}$   | Hx         | 2.18        | 1.542, 1.516      |
| <b>Stilbite</b><br>D. 443, W. 401             | (1) $\text{CaAl}_2\text{Si}_6\text{O}_{16} \cdot 6\text{H}_2\text{O}$<br>(+ $\text{NaAlSi}_7\text{O}_{16} \cdot 6\text{H}_2\text{O}$ )<br>(2) Group name incl. Harmotome,<br>Phillipsite, Wellsite | Mc         | 2.15        | 1.504, 1.496      |

\* Recorded G, but evidently too low.

| <i>Name and Reference.</i>                 | <i>Composition.</i>                                    | <i>Cr.</i> | <i>G.</i>   | <i>N.</i>    |
|--|--|------------|-------------|--------------|
| <b>Stilpnomelane</b><br>W. 372, Dl. 2 (3)  | Ill-defined ferruginous Chlorite (?)<br>near Daphnite  | Mc         | 2.90        | 1.66, 1.57   |
| <b>Stokesite</b><br>W. 222, DAp. 2         | $H_4CaSnSi_3O_{11}$                                    | Or         | 3.20        | 1.619, 1.609 |
| <b>Stolzite</b><br>D. 817, Dl. 4 (2)       | $PbWO_4$   | Tt         | 8.20        | 2.268, 2.182 |
| <b>Stratopeite</b><br>W. 196, MT.          | Mixture of decomposition products<br>of Rhodonite      | —          | —           | —            |
| <b>Strengite</b><br>D. 608, ZK. 55         | $Fe''PO_4 \cdot 2H_2O$                                 | Or         | 2.87        | 1.75, 1.71   |
| <b>Strigovite</b><br>W. 382, Dl. 2 (3)     | $H_4Fe''_2(Al, Fe)_2Si_2O_{11}$                        | Mc ?       | 3.15        | 1.67, 1.65   |
| <b>Stromeyerite</b><br>D. 55, Dl. 4 (1)    | $(Cu, Ag)_2S$  | Or         | 6.25        | Op           |
| <b>Strontianapatite</b><br>W. 130          | = Fermorite  | —          | —           | —            |
| <b>Strontianite</b><br>D. 280, W. 83       | $SrCO_3$   | Or         | 3.70        | 1.666, 1.516 |
| <b>Struverite</b><br>Dl. 3 (1), MM. 18     | $FeTa_2O_6 + Ti_3O_6$                                  | Tt         | 4.7-<br>7.2 | Op           |
| <b>Struvite</b><br>D. 585, Dl. 3 (1)       | $NH_4MgPO_4 \cdot 6H_2O$                               | Or         | 1.72        | 1.504, 1.495 |
| <b>Sturtite</b><br>MA. 4, AM. 15           | $H_3Mn''_3Fe'''Si_4O_{14} \cdot 10H_2O$                | Am         | 2.05        | 1.558        |
| <b>Stutzite</b><br>D. 41, Dl. 4 (1)        | $Ag_4Te$   | Hx ?       | ?           | Op           |
| <b>Stylopyrite</b><br>D. 141, Dl. 4 (1)    | $Cu_3SbS_3$  | Mc         | 5.0         | Op           |
| <b>Stypticite</b><br>H. 1 (3), Dl. 4 (2)   | = Fibroferrite   | —          | —           | —            |
| <b>Sulphatapatite</b><br>W. 129            | Mixture of Fluor- and Hydroxyapa-<br>tite with Gypsum. | —          | —           | —            |
| <b>Sulphoborite</b><br>H. 1 (4), Dl. 3 (2) | $6MgO \cdot 2SO_3 \cdot 2B_2O_3 \cdot 9H_2O$           | Or         | 2.42        | 1.544, 1.527 |
| <b>Sulphohalite</b><br>D. 728, W. 118      | $2Na_2SO_4 \cdot Na_2ClF$                              | Is         | 2.49        | 1.454        |
| <b>Sulphur</b><br>D. 3, W. 14              | S  | Or         | 2.05        | 2.245, 1.958 |
| <b>Sulvanite</b><br>DAp. 2, Dl. 4 (1)      | $Cu_2VS_4$   | Or         | 4.00        | Op           |
| <b>Sursassite</b><br>MA. 3, AM. 12         | $H_6Mn''_5Al_4Si_5O_{21}$                              | Or         | 3.25        | 1.760, 1.751 |
| <b>Sussexite</b><br>D. 693, W. 93          | $H(Mn, Mg)BO_3$  | Or ?       | 3.25        | 1.712, 1.639 |
| <b>Svabite</b><br>W. 128, H. 1 (4)         | $Ca_5F(AsO_4)_3$                                       | Hx         | 3.55        | 1.706, 1.698 |

| <i>Name and Reference.</i>               | <i>Composition.</i>  | <i>Cr.</i>     | <i>G.</i>     | <i>N.</i>         |
|--|--|----------------|---------------|-------------------|
| <b>Svanbergite</b><br>W. 119, H. 1 (4)   | $\text{SrSO}_4 \cdot \text{AlPO}_4 \cdot 2\text{Al}(\text{OH})_3$                                    | Hx             | 3.30          | 1.65, 1.64        |
| <b>Swedenborgite</b><br>ZK. 60, MA. 2    | $\text{NaAl}_2\text{O}_2\text{SbO}_4$  | Hx             | 4.30          | 1.772, 1.770      |
| <b>Sychnodymite</b><br>ZK. 66, MA. 1     | Nickeliferous var. of Carrollite   | —              | —             | —                 |
| <b>Sylvanite</b><br>D. 104, Dl. 4 (1)    | $(\text{Au}, \text{Ag})\text{Te}_2$  | Mc             | 8.05          | Op                |
| <b>Sylvite</b><br>D. 167, H. 1 (2)       | KCl  | Is             | 1.99          | 1.490             |
| <b>Symplesite</b><br>D. 598, W. 126      | $\text{Fe}''_3(\text{AsO}_4)_2 \cdot 8\text{H}_2\text{O}$  | Mc             | 2.95          | 1.702, 1.635      |
| <b>Synadelphite</b><br>D. 579, W. 151    | $2(\text{Mn}, \text{Al})\text{AsO}_4 \cdot 5\text{Mn}''(\text{OH})_2$                                | Mc             | 3.45          | 1.90, 1.86        |
| <b>Synchisite</b><br>DAp. 2, MA. 1       | = Parisite   | —              | —             | —                 |
| <b>Syngenite</b><br>H. 1 (3), Dl. 4 (2)  | $\text{K}_2\text{Ca}(\text{SO}_4)_2 \cdot \text{H}_2\text{O}$  | Mc             | 2.58          | 1.518, 1.500      |
| <b>Syntagmatite</b><br>MA. 4, H. 2       | $\text{H}_2\text{Ca}_2(\text{Mg}, \text{Fe})_4\text{Al}_2\text{Si}_6\text{O}_{22}$<br>= Hornblende ? | Tc             | 3.30          | ?                 |
| <b>Szaibelyite</b><br>D. 697, AM. 13     | $\text{Mg}_2\text{B}_2\text{O}_5 \cdot \text{H}_2\text{O}$   | Tt<br>or<br>Hx | 2.80          | 1.650, 1.575      |
| <b>Szmikite</b><br>D. 745, H. 1 (3)      | $\text{MnSO}_4 \cdot \text{H}_2\text{O}$   | Mc             | 3.10          | 1.632, 1.562      |
| <b>Szomolnokite</b><br>MA. 4, H. 1 (3)   | = Ferropallidite   | —              | —             | —                 |
| <b>Tachhydrite</b><br>D. 202, W. 32      | $\text{Mg}_2\text{CaCl}_6 \cdot 12\text{H}_2\text{O}$  | Hx             | 1.67          | 1.522, 1.513      |
| <b>Taenite</b><br>D. 25, H. 1 (1)        | FeNi to $\text{Fe}_3\text{Ni}$   | Is             | 7.6           | Op                |
| <b>Tagilite</b><br>D. 630, W. 135        | $\text{Cu}_2(\text{OH})\text{PO}_4 \cdot \text{H}_2\text{O}$   | Mc             | 4.10          | 1.85, 1.69        |
| <b>Talc</b><br>Dl. 2 (1), D. 484         | $\text{H}_2\text{Mg}_3(\text{SiO}_3)_4$  | Mc             | 2.70          | 1.585, 1.540      |
| <b>Tallingite</b><br>H. 1 (2), Dl. 4 (3) | $\text{Cu}_5(\text{OH})_5\text{Cl}_2 \cdot 4\text{H}_2\text{O}$                                      | ?              | 3.5           | ?                 |
| <b>Tamarugite</b><br>D. 767, Dl. 4 (2)   | $\text{NaAl}(\text{SO}_4)_2 \cdot 6\text{H}_2\text{O}$   | Mc             | 2.05          | 1.496, 1.484      |
| <b>Tangéite</b><br>MM. 21, H. 1 (4)      | $\text{CaCu}(\text{OH})\text{VO}_4$  | Or or<br>Mc    | 3.7           | 2.10, 2.01        |
| <b>Tantalite</b><br>D. 526, W. 160       | $\text{FeTa}_2\text{O}_6$  | Or             | 6.55–<br>7.90 | 2.43, 2.26,<br>AO |
| <b>Tanteuxenite</b><br>MA. 4, AM. 14     | $\text{YTi}_2\text{TaO}_8 (+ \text{CaTiTa}_2\text{O}_8)$   | Or             | 5.3–<br>5.9   | ?                 |

| <i>Name and Reference.</i>                  | <i>Composition.</i>   | <i>Cr.</i> | <i>G.</i>     | <i>N.</i>    |
|---|---|------------|---------------|--------------|
| <b>Tapalpite</b><br>D. 143, JWAS. 11        | $\text{Ag}_2\text{Bi}_2\text{Te}_2\text{S}$ (a mixture)   | —          | —             | —            |
| <b>Tapiolite</b><br>D. 527, H. 1 (4)        | (1) $\text{FeTa}_2\text{O}_6$<br>(2) Sub-group of Rutile Group                                  | Tt         | 6.55–<br>7.90 | Op or AO.    |
| <b>Taramellite</b><br>W. 276, DAp. 2        | $\text{Ba}_4\text{Fe}''\text{Fe}'''_4\text{Si}_{10}\text{O}_{31}$                               | Or ?       | 3.90          | 1.83, 1.77   |
| <b>Taramite</b><br>MA. 3, AM. 11            | Sub-var. of Riebeckite ?  | Mc         | 3.46          | ?            |
| <b>Taranakite</b><br>Dl. 3 (1), D. 645      | K, Al, $\text{PO}_4$ , $\text{H}_2\text{O}$ ; perhaps =<br>Minervite                            | Am         | ?             | ?            |
| <b>Tarbuttite</b><br>W. 134, H. 1 (4)       | $\text{Zn}_3(\text{OH})\text{PO}_4$   | Tc         | 4.15          | 1.713, 1.660 |
| <b>Tarnowitzite</b><br>MA. 2, MT.           | Lead-bearing var. of Aragonite  | Or         | 3.15          | ?            |
| <b>Tavistockite</b><br>D. 575, W. 150       | $\text{Ca}_3\text{Al}_2(\text{OH})_6(\text{PO}_4)_2$  | Or         | ?             | 1.544, 1.522 |
| <b>Tawmawite</b><br>AM. 12, DAp. 3          | Chromiferous Epidote  | Mc         | —             | —            |
| <b>Taylorite</b><br>D. 715, W. 98           | $(\text{NH}_4)\text{K}_5(\text{SO}_4)_3$  | Or         | ?             | 1.459, 1.447 |
| <b>Teallite</b><br>MM. 14, Dl. 4 (1)        | $\text{PbSnS}_3$  | Or         | 6.35          | Op           |
| <b>Tellurite</b><br>W. 61, Dl. 4 (1)        | $\text{TeO}_2$  | Or         | 5.90          | 2.35, 2.00   |
| <b>Tellurium</b><br>D. 7, Dl. 4 (1)         | Te  | Hx         | 6.25          | Op           |
| <b>Temiskamite</b><br>DAp. 3, Dl. 4 (1)     | = Maucherite  | —          | —             | —            |
| <b>Tengerite</b><br>H. 1 (3), W. 88         | $\text{Y}_2(\text{OH})_2(\text{CO}_3)_2$ ?  | ?          | ?             | 1.585, 1.555 |
| <b>Tennantite</b><br>D. 149, Dl. 4 (1)      | $\text{Cu}_3\text{AsS}_3$ or $\text{Cu}'_{10}\text{Cu}''_2\text{As}_3\text{S}_{13}$             | Is         | 4.70          | Op           |
| <b>Tenorite</b><br>D. 230, W. 41            | $\text{CuO}$  | Tc         | 6.35          | AO           |
| <b>Tephroite</b><br>D. 379, W. 171          | $\text{Mn}_2\text{SiO}_4$   | Or         | 4.10          | 1.797, 1.759 |
| <b>Terlinguaite</b><br>W. 38, Dl. 4 (3)     | $\text{Hg}_2\text{OCl}$   | Mc         | 8.70          | 2.66, 2.35   |
| <b>Termierite</b><br>AM. 10, W. 241         | $\text{Al}_2\text{O}_3 \cdot 6\text{SiO}_2 \cdot 18\text{H}_2\text{O}$                          | Am         | ?             | 1.403        |
| <b>Teschermacherite</b><br>D. 287, H. 1 (3) | $\text{HNH}_4\text{CO}_3$   | Or         | 1.50          | 1.554, 1.423 |
| <b>Tetradymite</b><br>D. 31, Dl. 4 (1)      | $\text{Bi}_2\text{Te}_2\text{S}$  | Hx         | 7.35          | Op           |
| <b>Tetrahedrite</b><br>D. 148, Dl. 4 (1)    | $\text{Cu}_3\text{SbS}_3$ or $\text{Cu}'_{10}\text{Cu}''_2\text{Sb}_3\text{S}_{13}$             | Is         | 4.8           | Op or AO     |
| <b>Thalenite</b><br>W. 236, MA. 2           | $\text{Y}_2\text{Si}_2\text{O}_7$   | Mc         | 4.40          | 1.744, 1.731 |
| <b>Thaumasite</b><br>D. 502, W. 168         | $3\text{CaO} \cdot \text{CO}_2 \cdot \text{SiO}_2 \cdot \text{SO}_3 \cdot 14\text{H}_2\text{O}$ | Hx         | 1.87          | 1.504, 1.467 |

| <i>Name and Reference.</i>                               | <i>Composition.</i>   | <i>Cr.</i>  | <i>G.</i> | <i>N.</i>    |
|--|---|-------------|-----------|--------------|
| <b>Thenardite</b><br>D. 716, Dl. 4 (2)                   | $\text{Na}_2\text{SO}_4$  | Or          | 2.68      | 1.485, 1.471 |
| <b>Thermokalite</b><br>AM. 15, MM. 22                    | Mixture of Trona, etc.  | —           | —         | —            |
| <b>Thermonatrite</b><br>D. 294, H. 1 (3)                 | $\text{Na}_2\text{CO}_3 \cdot \text{H}_2\text{O}$   | Or          | 1.55      | 1.524, 1.420 |
| <b>Thomsenolite</b><br>D. 206, Dl. 4 (3)                 | $\text{NaCaAlF}_6 \cdot \text{H}_2\text{O}$   | Mc          | 3.00      | 1.415, 1.407 |
| <b>Thomsonite</b><br>AM. 10, Dl. 2 (3)                   | $\text{Na}_2\text{Ca}_4\text{Al}_{10}\text{Si}_{10}\text{O}_{40} \cdot 11\text{H}_2\text{O} +$<br>$\text{Na}_3\text{Ca}_3\text{Al}_9\text{Si}_{11}\text{O}_{40} \cdot 11\text{H}_2\text{O}$ | Or          | 2.32      | 1.541, 1.529 |
| <b>Thorianite</b><br>W. 49, DAp. 2                       | $\text{ThO}_2$  | Is          | 9.30      | 2.20         |
| <b>Thorite</b><br>D. 395, W. 52                          | $\text{ThSiO}_4$  | Tt          | 5.3       | 1.81, 1.80   |
| <b>Thorogummite</b><br>(Texas)<br>D. 712B, Dl. 3 (1)     | $\text{Th}_2\text{USi}_3\text{O}_{12} \cdot 6\text{H}_2\text{O}$  | Am          | 4.50      | ?            |
| <b>Thorogummite</b><br>(W. Australia)<br>MA. 4, RSWA. 16 | = Nicolayite  | —           | —         | —            |
| <b>Thorotungstite</b><br>Dl. 4 (2), MA. 3                | $\text{Th}(\text{WO}_4)_2 \cdot 2\text{H}_2\text{O}$  | Or          | 5.55      | ?            |
| <b>Thortveitite</b><br>W. 236, MA. 1, 2                  | $(\text{Sc}, \text{Y})_2\text{Si}_2\text{O}_7$  | Mc          | 3.50      | 1.809, 1.756 |
| <b>Thulite</b><br>Dl. 2 (2), W. 354                      | Manganiferous var. of Zoisite   | Or          | 3.35      | ?            |
| <b>Thuringite</b><br>D. 473, W. 376                      | = Daphnite  | —           | —         | —            |
| <b>Tiemannite</b><br>D. 60, Dl. 4 (1)                    | $\text{HgSe}$   | Is          | 7.5       | Op           |
| <b>Tikhvinit</b><br>AM. 13, MA. 3                        | $2\text{SrO} \cdot 2\text{Al}_2\text{O}_3 \cdot \text{P}_2\text{O}_5 \cdot \text{SO}_3 \cdot 6\text{H}_2\text{O};$<br>= Impure Svanbergite ?  | Hx          | 3.30      | 1.62         |
| <b>Tilasite</b><br>H. 1 (4), Dl. 3 (1)                   | $\text{CaMgFAsO}_4$   | Mc          | 3.75      | 1.675, 1.640 |
| <b>Tilkerodite</b><br>Dl. 4 (1), AM. 15                  | Mixt. of Clausthalite, Cobaltite, etc.  | —           | —         | —            |
| <b>Tin</b><br>D. 19, H. 1 (1)                            | $\text{Sn}$   | Tt or<br>Or | 7.30      | ?            |
| <b>Tincal</b><br>Dl. 3 (2), D. 707                       | = Borax   | —           | —         | —            |
| <b>Tincalconite</b><br>USPP. 158, D. 707                 | $\text{Na}_2\text{B}_4\text{O}_7 \cdot 5\text{H}_2\text{O}$   | Hx          | 1.88      | 1.474, 1.461 |
| <b>Tinzenite</b><br>W. 277, MA. 2                        | $\text{CaMn}''\text{Al}(\text{SiO}_4)_2$  | Mc          | 3.30      | 1.704, 1.693 |
| <b>Titanclinohumite</b><br>W. 225, MA. 1                 | Titaniferous var of Clinohumite   | Mc          | 3.25      | 1.702, 1.669 |
| <b>Titanelpidite</b><br>MA. 3, AM. 12                    | $\text{H}_6\text{Na}_2\text{Ti}(\text{SiO}_3)_6$  | Or          | 2.54      | 1.698, 1.681 |

| <i>Name and Reference.</i>              | <i>Composition.</i>   | <i>Cr.</i> | <i>G.</i> | <i>N.</i>    |
|---|---|------------|-----------|--------------|
| <b>Titanite</b><br>W. 217, Dl. 3 (1)    | $\text{CaTiSiO}_5$  | Mc         | 3.50      | 2.01, 1.90   |
| <b>Titanomagnetite</b><br>MT.           | Parallel intergrowth of Magnetite and Ilmenite  | —          | —         | —            |
| <b>Titanolivine</b><br>D. 376, W. 225   | = Titanclinohumite  | —          | —         | —            |
| <b>Tocornolite</b><br>MT. H. 1 (2)      | $\text{AgHgI}_2$  | Is         | ?         | ?            |
| <b>Toddite</b><br>AM. 11, MA. 3         | U, Y, Fe'', Mn'', Ca, Nb, Ta, O, H <sub>2</sub> O   | Am.        | 5.05      | ?            |
| <b>Topaz</b><br>Dl. 2 (2), W. 235       | $\text{Al}_2(\text{F, OH})_2\text{SiO}_4$   | Or         | 3.55      | 1.620, 1.610 |
| <b>Topazolite</b><br>D. 370, MA. 3      | = Andradite   | —          | —         | —            |
| <b>Torbernite</b><br>D. 659, W. 143     | (1) $\text{Cu}(\text{UO}_2)_2(\text{PO}_4)_2 \cdot 12\text{H}_2\text{O}$<br>(2) Group name incl. Autunite, Uranocircite, Uranospinite and Zeunerite | Or         | 3.20      | 1.592, 1.582 |
| <b>Torendrikite</b><br>W. 208, MA. 1    | = Rhodusite   | —          | —         | —            |
| <b>Tornebohmite</b><br>W. 236, MA. 1    | $(\text{Ce, Al})_3\text{F}(\text{SiO}_4)_2$   | ?          | 4.95      | 1.878, 1.845 |
| <b>Tourmaline</b><br>D. 426, W. 246     | Group name incl. Dravite, Elbaite, Schorl.  | —          | —         | —            |
| <b>Trechmannite</b><br>ICT., Dl. 4 (1)  | $\text{AgAsS}_2$  | Hx         | 4.70      | 2.6          |
| <b>Tremolite</b><br>D. 338, MA. 4       | $\text{H}_2\text{Ca}_2\text{Mg}_5(\text{SiO}_3)_8$  | Mc         | 2.95      | 1.625, 1.600 |
| <b>Trevorite</b><br>MA. 2, MT.          | $\text{NiFe}_2\text{O}_4$   | Is         | 5.15      | Op           |
| <b>Trichalcite</b><br>D. 596, Dl. 3 (1) | $\text{Cu}_3(\text{AsO}_4)_2 \cdot 5\text{H}_2\text{O}$   | Or         | ?         | 1.698, 1.670 |
| <b>Tridymite</b><br>D. 211, W. 60       | $\text{SiO}_2$  | Or         | 2.26      | 1.473, 1.469 |
| <b>Trigonite</b><br>ZK. 61, MA. 1       | $\text{HMnPb}_3(\text{AsO}_3)_2$  | Mc         | 8.25      | 2.16, 2.08   |
| <b>Trimerite</b><br>D. 380, W. 219      | $\text{Be}_3\text{Mn}_2\text{Ca}(\text{SiO}_4)_3$   | Mc         | 3.45      | 1.725, 1.715 |
| <b>Triphane</b><br>D. 327, Dl. 2 (2)    | = Spodumene   | —          | —         | —            |
| <b>Triphylite</b><br>D. 543, H. 1 (4)   | (1) $\text{LiFe''PO}_4$<br>(2) Group name incl. Lithiophilite, Natrophilite and Beryllonite   | Or         | 3.50      | 1.705, 1.697 |
| <b>Triplite</b><br>D. 555, Dl. 3 (1)    | $\text{Mn''}_2\text{FPO}_4$   | Mc         | 3.80      | 1.672, 1.650 |
| <b>Triploidite</b><br>D. 556, W. 133    | $\text{Mn''}_2(\text{OH})\text{PO}_4$   | Mc         | 3.70      | 1.730, 1.725 |



## 78 A KEY TO MINERAL GROUPS, SPECIES AND VARIETIES

| <i>Name and Reference.</i>                | <i>Composition.</i>   | <i>Cr.</i> | <i>G.</i> | <i>N.</i>    |
|---|---|------------|-----------|--------------|
| <b>Trippkeite</b><br>D. 675, Dl. 3 (1)    | $\text{Cu}_3(\text{AsO}_3)_2 ?$   | Tt         | ?         | 2.12, 1.90   |
| <b>Tripuhyite</b><br>W. 155, H. 1 (4)     | $\text{Fe}''_2\text{Sb}_2\text{O}_7$  | ?          | 5.80      | 2.33, 2.19   |
| <b>Tritomite</b><br>D. 350, W. 248        | H, Na, Ca, Ce, Th, Si, B, F, O  | Hx         | 4.20      | 1.75         |
| <b>Troegerite</b><br>D. 665, W. 145       | $(\text{UO}_2)_3(\text{AsO}_4)_2 \cdot 12\text{H}_2\text{O}$                                  | Mc ?       | 3.25      | 1.629, 1.584 |
| <b>Troilite</b><br>D. 73, Dl. 4 (1)       | FeS   | Hx         | 4.80      | Op           |
| <b>Trona</b><br>D. 299, H. 1 (3)          | $\text{HNa}_3(\text{CO}_3)_2 \cdot 2\text{H}_2\text{O}$                                       | Mc         | 2.13      | 1.540, 1.412 |
| <b>Troostite</b><br>D. 381, Dl. 2 (1)     | Manganiferous var. of Willemite   | Hx         | 4.15      | 1.712, 1.693 |
| <b>Trudellite</b><br>MA. 3, AM. 11        | $\text{Al}_{10}\text{Cl}_{12}(\text{OH})_{12}(\text{SO}_4)_3 \cdot 30\text{H}_2\text{O}$      | Hx         | 1.93      | 1.560, 1.495 |
| <b>Tscheffkinite</b><br>Dl. 3 (1), W. 252 | $(\text{Ca}, \text{Fe})_2\text{Ce}_2(\text{Si}, \text{Ti})_5\text{O}_{15}$                    | Mc ?       | 4.45      | 1.9          |
| <b>Tschermigite</b><br>D. 765, H. 1 (3)   | $\text{NH}_4\text{Al}(\text{SO}_4)_2 \cdot 12\text{H}_2\text{O}$                              | Is         | 1.64      | 1.459        |
| <b>Tsumebite</b><br>W. 136, Dl. 3 (1)     | $(\text{Pb}, \text{Cu})_5(\text{OH})_4(\text{PO}_4)_2 \cdot 6\text{H}_2\text{O}$              | Mc         | 6.10      | 1.956, 1.885 |
| <b>Tungstenite</b><br>MA. 3, Dl. 4 (1)    | $\text{WS}_2$   | Am ?       | 7.4       | Op           |
| <b>Tungstite</b><br>D. 220                | = Ferritungstite  | —          | —         | —            |
| <b>Turgite</b><br>D. 255, W. 45           | $2\text{Fe}_2\text{O}_3 \cdot \text{H}_2\text{O} ?$ Possibly mixture of Hæmatite and Goethite | Hx ?       | 4.7       | 2.6, 2.45    |
| <b>Turite</b><br>MA. 1                    | = Turgite   | —          | —         | —            |
| <b>Turquoise</b><br>D. 642, W. 153        | $\text{CuAl}_6(\text{OH})_8(\text{PO}_4)_4 \cdot 5\text{H}_2\text{O}$                         | Tc         | 2.85      | 1.65, 1.61   |
| <b>Tychite</b><br>W. 118, H. 1 (3)        | $\text{Na}_6\text{Mg}_2(\text{SO}_4)(\text{CO}_3)_4$  | Is         | 2.50      | 1.508        |
| <b>Tyrolite</b><br>D. 635, Dl. 3 (1)      | $\text{Cu}_5(\text{OH})_4(\text{AsO}_4)_2 \cdot 7\text{H}_2\text{O}$                          | Or         | 3.20      | 1.730, 1.694 |
| <b>Tysonite</b><br>D. 182, Dl. 4 (3)      | $(\text{Ce}, \text{La}, \text{Di})\text{F}_3$   | Hx         | 6.15      | 1.611, 1.605 |
| <b>Tyuyamunite</b><br>Dl. 3 (1), MM. 20   | $\text{Ca}(\text{UO}_2)_2(\text{VO}_4)_2 \cdot 8\text{H}_2\text{O} *$                         | Or         | 3.35      | 2            |
| <b>Uddevallite</b><br>D. 233, H. 1 (2)    | Titaniferous var. of Hæmatite ;<br>$n\text{Fe}_2\text{O}_3 + \text{FeTiO}_3$                  | Hx         | 4.80      | Op           |
| <b>Ugrandite</b><br>W. 257, MM. 21        | Sub-group of Garnet incl. Grossularite, Andradite & Uvarovite                                 | —          | —         | —            |
| <b>Ulexite</b><br>D. 708, W. 95           | $\text{NaCaB}_5\text{O}_9 \cdot 8\text{H}_2\text{O}$  | Mc         | 1.90      | 1.520, 1.493 |

\* 4 to 10  $\text{H}_2\text{O}$  with G. 4.3 to 3.3.

| <i>Name and Reference.</i>                | <i>Composition.</i>  | <i>Cr.</i> | <i>G.</i>    | <i>N.</i>    |
|---|--|------------|--------------|--------------|
| <b>Ullmannite</b><br>D. 92, Dl. 4 (1)     | NiSbS  | Is         | 6.85         | Op           |
| <b>Ulrichite</b><br>W. 69, MA. 3          | UO <sub>2</sub>  | Is         | 9.5          | Op           |
| <b>Umangite</b><br>Dl. 4 (1), MA. 3       | Cu <sub>3</sub> Se <sub>2</sub>  | ?          | 5.62         | Op           |
| <b>Uraconite</b><br>W. 111, Dl. 4 (3)     | U, SO <sub>4</sub> , H <sub>2</sub> O  | Or         | ?            | 1.85, 1.75   |
| <b>Uralite</b><br>D. 338, H. 2            | = Actinolite   | —          | —            | —            |
| <b>Uraninite</b><br>Dl. 4 (3), W. 69      | U <sub>3</sub> O <sub>8</sub>  | Or ?       | 9.0          | Op           |
| <b>Uranite</b><br>W. 143, D. 659          | Group name incl. Tobernite, Autunite, Uranospathite, Zeunerite, etc.   | —          | —            | —            |
| <b>Uranochalcite</b><br>W. 117, Dl. 4 (3) | Ca, Cu, UO <sub>3</sub> , SO <sub>4</sub> , H <sub>2</sub> O   | ?          | ?            | 1.663, 1.655 |
| <b>Uranocircite</b><br>D. 663, Dl. 3 (1)  | Ba(UO <sub>2</sub> ) <sub>2</sub> (PO <sub>4</sub> ) <sub>2</sub> · 8H <sub>2</sub> O                            | Or         | 3.55         | 1.623, 1.610 |
| <b>Uranophane</b><br>MA. 3, W. 406        | Ca(UO <sub>2</sub> ) <sub>2</sub> Si <sub>2</sub> O <sub>7</sub>   | Or         | 3.90         | 1.671, 1.643 |
| <b>Uranopilite</b><br>D. 807, Dl. 4 (3)   | CaU <sub>8</sub> (OH) <sub>46</sub> (SO <sub>4</sub> ) <sub>2</sub> · 2H <sub>2</sub> O                          | Tc         | 3.90         | 1.631, 1.621 |
| <b>Uranospathite</b><br>W. 144, Dl. 4 (3) | Ca(UO <sub>2</sub> ) <sub>2</sub> (PO <sub>4</sub> ) <sub>2</sub> · 12H <sub>2</sub> O                           | Or         | 2.50         | 1.521, 1.488 |
| <b>Uranospherite</b><br>D. 713, W. 110    | Bi(OH)UO <sub>4</sub> · H <sub>2</sub> O   | Or         | 6.35         | 2.050, 1.955 |
| <b>Uranospinite</b><br>D. 662, W. 144     | Ca(UO <sub>2</sub> ) <sub>2</sub> (AsO <sub>4</sub> ) <sub>2</sub> · 8H <sub>2</sub> O                           | Or         | 3.45         | 1.587, 1.560 |
| <b>Uranothallite</b><br>H. 1 (3), D. 307  | Ca <sub>2</sub> U(CO <sub>3</sub> ) <sub>4</sub> · 10H <sub>2</sub> O  | Or         | 2.15         | 1.539, 1.500 |
| <b>Uranothorite</b><br>MA. 3, AM. 12      | Uraniferous var. of Thorite  | Tt         | 4.40         | 1.710        |
| <b>Uranotile</b><br>W. 406, D. 503        | = Uranophane   | —          | —            | —            |
| <b>Urbanite</b><br>W. 190, MT.            | Var. of Acmite incl. some Diopside mol.  | Mc         | 3.50         | 1.710, 1.679 |
| <b>Ussingite</b><br>W. 386, MA. 3         | HNa <sub>2</sub> Al(SiO <sub>3</sub> ) <sub>3</sub>  | Tc         | 2.50         | 1.545, 1.504 |
| <b>Utahite</b><br>D. 786, Ls.             | = Jarosite   | —          | —            | —            |
| <b>Utahlite</b><br>DAp. 1, MT.            | = Variscite  | —          | —            | —            |
| <b>Uvanite</b><br>DAp. 3, W. 145          | 2UO <sub>3</sub> · 3V <sub>2</sub> O <sub>5</sub> · 15H <sub>2</sub> O   | Or         | ?            | 2.057, 1.817 |
| <b>Uvarovite</b><br>D. 370, W. 263        | (1) Ca <sub>3</sub> Cr <sub>2</sub> (SiO <sub>4</sub> ) <sub>3</sub> or<br>(2) Chromiferous var. of Grossularite | Is<br>Is   | 3.70<br>3.55 | 1.87<br>1.76 |

| <i>Name and Reference.</i>               | <i>Composition.</i>  | <i>Cr.</i> | <i>G.</i> | <i>N.</i>    |
|--|--|------------|-----------|--------------|
| <b>Uzbekite</b><br>MA. 3, AM. 14         | $\text{Cu}_3(\text{VO}_4)_2 \cdot 3\text{H}_2\text{O}$   | ?          | ?         | ?            |
| <b>Valencianite</b><br>W. 322, MT.       | = Adularia   | —          | —         | —            |
| <b>Valentinite</b><br>D. 216, W. 45      | $\text{Sb}_2\text{O}_3$  | Or         | 5.75      | 2.35 2.18    |
| <b>Vanadinite</b><br>D. 552, H. 1 (4)    | $\text{Pb}_5\text{Cl}(\text{VO}_4)_3$  | Hx         | 7.0       | 2.358, 2.311 |
| <b>Vanoxite</b><br>AM. 10, MA. 2         | $2\text{V}_2\text{O}_4 \cdot \text{V}_2\text{O}_5 \cdot 8\text{H}_2\text{O}$                       | Or ?       | ?         | ?            |
| <b>Vanthoffite</b><br>W. 112, Dl. 4 (2)  | $\text{Na}_6\text{Mg}(\text{SO}_4)_4$  | Mc         | 2.70      | 1.489, 1.485 |
| <b>Variscite</b><br>D. 611, AM. 10       | $\text{AlPO}_4 \cdot 2\text{H}_2\text{O}$  | Or         | 2.52      | 1.585, 1.562 |
| <b>Vashegyite</b><br>W. 142, Dl. 3 (1)   | $\text{Al}_4(\text{OH})_3(\text{PO}_4)_3 \cdot 13\text{H}_2\text{O}$                               | Or         | 1.95      | 1.50, 1.48   |
| <b>Vaterite</b><br>W. 74, MA. 3          | $\text{CaCO}_3$  | Hx         | 2.55      | 1.645, 1.550 |
| <b>Vauquelinite</b><br>D. 727, W. 120    | $(\text{Pb}, \text{Cu})_5(\text{CrO}_4)_2(\text{PO}_4)_2$  | Mc         | 6.0       | 2.22, 2.11   |
| <b>Vauxite</b><br>W. 153, MA. 3          | $\text{Fe}''\text{Al}_2(\text{OH})_2(\text{PO}_4)_2 \cdot 5\text{H}_2\text{O}$                     | Tc         | 2.35      | 1.562, 1.551 |
| <b>Vegasite</b><br>W. 116, H. 1 (3)      | $\text{PbFe}'''\text{Fe}''_6(\text{OH})_{14}(\text{SO}_4)_3$ . Perhaps =<br>Plumbojarosite         | Hx         | 3.46      | 1.820, 1.755 |
| <b>Velardenite</b><br>AM. 14, Dl. 2 (3)  | = Gehlenite  | —          | —         | —            |
| <b>Venasquite</b><br>W. 385              | = Chloritoid   | —          | —         | —            |
| <b>Vermiculite</b><br>D. 480, MT.        | Group name incl. Jeffersite, etc.  | —          | —         | —            |
| <b>Vernadskyite</b><br>DAp. 3, H. 1 (3)  | $\text{Cu}_4(\text{OH})_2(\text{SO}_4)_3 \cdot 4\text{H}_2\text{O}$                                | ?          | 3.3 +     | ?            |
| <b>Vesbine</b><br>AM. 12, MA. 3          | $(\text{Pb}, \text{Cu})_2(\text{OH})\text{VO}_4 \cdot 3\text{H}_2\text{O}$                         | ?          | ?         | ?            |
| <b>Vesuvianite</b><br>D. 393, W. 344     | $\text{Ca}_{12}\text{Al}_6(\text{OH})_4\text{Si}_{10}\text{O}_{39}$                                | Tt         | 3.40      | 1.720, 1.724 |
| <b>Veszelyite</b><br>D. 637, W. 136      | $(\text{Zn}, \text{Cu})_7(\text{OH})_8(\text{P}, \text{As})_2\text{O}_8 \cdot 5\text{H}_2\text{O}$ | Tc         | 3.53      | 1.695, 1.640 |
| <b>Vilatéite</b><br>LM. 4, W. 138        | = Strengite  | —          | —         | —            |
| <b>Villamaninite</b><br>Dl. 4 (1), MA. 1 | Mixture of Cu and Ni sulphides   | —          | —         | —            |
| <b>Villiaumite</b><br>W. 29, H. 1 (2)    | $\text{NaF}$   | Tt ?       | 2.80      | 1.328, 1.327 |
| <b>Viluite</b><br>W. 344, Dl. 2 (2)      | Boron-bearing var. of Vesuvianite  | Tt         | 3.40      | 1.720, 1.716 |
| <b>Violarite</b><br>AM. 14, 15, MA. 4    | $(\text{Ni}, \text{Fe})_3\text{S}_4$ , usually $\text{Ni}_2\text{FeS}_4$                           | Is         | 4.80      | Op           |

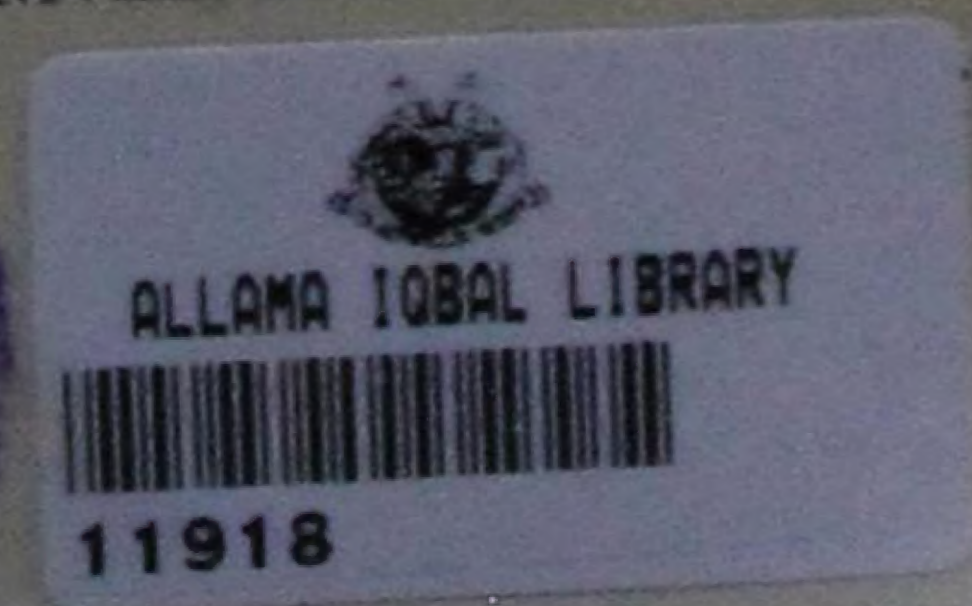
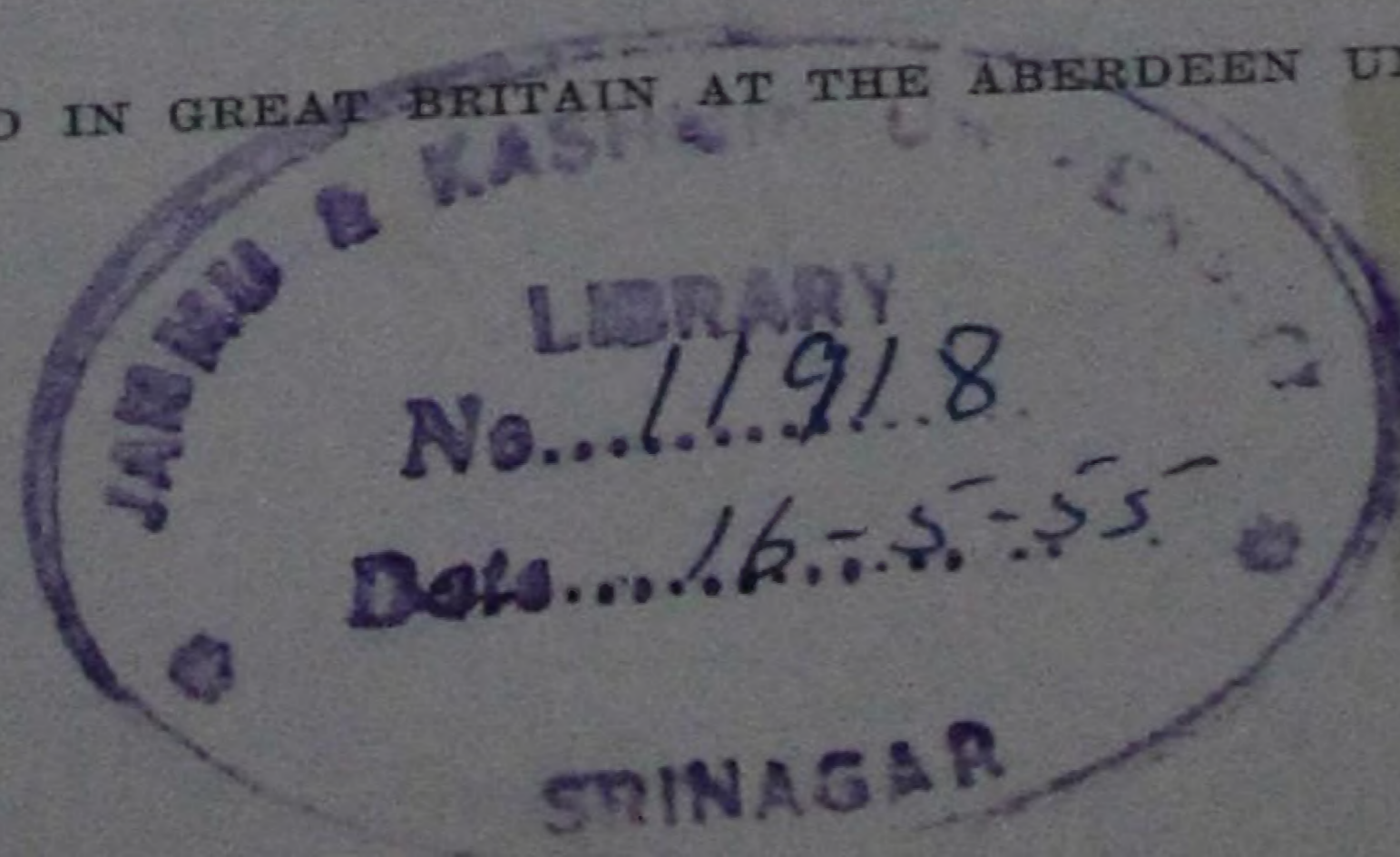
| <i>Name and Reference.</i>                 | <i>Composition.</i>   | <i>Cr.</i>  | <i>G.</i> | <i>N.</i>         |
|--|---|-------------|-----------|-------------------|
| <b>Viridine</b><br>W. 234, MA. 1           | Green-coloured Manganandalusite   | Or          | 3.20      | 1.691, 1.662      |
| <b>Vivianite</b><br>D. 597, W. 125         | (1) $\text{Fe}''_3(\text{PO}_4)_2 \cdot 8\text{H}_2\text{O}$<br>(2) Group name incl. Annabergite, Bobierrite, Erythrite, Hoernesite, Koettigite, etc. | Mc<br>—     | 2.70<br>— | 1.627, 1.580<br>— |
| <b>Voelckerite</b><br>W. 128, Dl. 3 (1)    | $\text{Ca}_5(\text{OH})(\text{PO}_4)_3$   | Hx          | 3.20      | 1.633, 1.629      |
| <b>Voglite</b><br>D. 309, H. 1 (3)         | $\text{CaCu}_2\text{U}_2(\text{CO}_3)_7 \cdot 14\text{H}_2\text{O}$   | Tc          | 3.35      | 1.564, 1.541      |
| <b>Volborthite</b><br>D. 633, W. 136       | $\text{Cu}_2(\text{Ca}, \text{Ba})(\text{OH})_3\text{VO}_4 \cdot 6\text{H}_2\text{O}$   | Mc          | 3.55      | 2.02, 2.01        |
| <b>Volchonskoite</b><br>W. 240             | $\text{H}_4\text{Cr}_2\text{Si}_2\text{O}_9$  | Mc          | 2.25      | 1.585             |
| <b>Voltaite</b><br>D. 796, H. 1 (3)        | $\text{H}_{10}\text{K}_2\text{Fe}''_4\text{Fe}'''_3(\text{OH})_9(\text{SO}_4)_{10} \cdot 4\text{H}_2\text{O}$   | Is or<br>Tt | 2.75      | 1.60              |
| <b>Voltzite</b><br>D. 108, W. 28           | $\text{Zn}_5\text{S}_4\text{O}$   | Hx          | 3.70      | 2.03              |
| <b>Vonsenite</b><br>AM. 14, MA. 1          | $4\text{FeO} \cdot \text{Fe}_2\text{O}_3 \cdot \text{B}_2\text{O}_3$  | Or          | 4.20      | Op                |
| <b>Vorobyevite</b><br>DAp. 3, LF. 5        | = Rosterite   | —           | —         | —                 |
| <b>Vrbaite</b><br>Dl. 4 (1), DAp. 3        | $\text{TlAs}_7\text{SbS}_5$   | Or          | 5.30      | AO                |
| <b>Wackenrodite</b><br>Dl. 3 (2), H. 1 (3) | $\text{H}_2\text{O} \cdot (\text{Pb}, \text{Mn})\text{O} \cdot 3\text{MnO}_2$   | Am          | 3.50      | Op                |
| <b>Wagnerite</b><br>D. 553, Dl. 3 (1)      | (1) $\text{Mg}_2\text{FPO}_4$<br>(2) Group name incl. Adelite, Herderite, Sarkinite, Spodiosite, Triplite, Triploidite, Zwieselite, etc.              | Mc<br>—     | 3.05<br>— | 1.582, 1.569<br>— |
| <b>Walpurgite</b><br>D. 666, W. 146        | $(\text{UO}_2)_3\text{Bi}_{10}(\text{OH})_{24}(\text{AsO}_4)_4$   | Tc          | 5.65      | 2.05, 1.90        |
| <b>Wapplerite</b><br>D. 622, Dl. 3 (1)     | $\text{H}(\text{Ca}, \text{Mg})\text{AsO}_4 \cdot 3\text{H}_2\text{O}$ (doubtful species)   | Tc          | 2.50      | 1.550, 1.525      |
| <b>Wardite</b><br>Dl. 3 (1), AM. 15        | $\text{Na}_4\text{CaAl}_{12}(\text{OH})_{18}(\text{PO}_4)_8 \cdot 8\text{H}_2\text{O}$  | Tt          | 2.84      | 1.599, 1.590      |
| <b>Warrenite</b><br>D. 126, JWAS. 11       | = Jamesonite  | —           | —         | —                 |
| <b>Warthaite</b><br>MT. MA. 3              | = Goongarrite   | —           | —         | —                 |
| <b>Warwickite</b><br>D. 700, W. 96         | $(\text{Mg}, \text{Fe})_3\text{B}_2\text{TiO}_8$  | Or          | 3.40      | 1.830, 1.806      |
| <b>Washingtonite</b><br>LM. 1, MT.         | Intergrowth of Häematite and Ilmenite   | —           | —         | —                 |

| <i>Name and Reference.</i> | <i>Composition.</i>   | <i>Cr.</i> | <i>G.</i> | <i>N.</i>    |
|----------------------------|---|------------|-----------|--------------|
| <b>Water</b>               |   |            |           |              |
| Dl. 3 (1)                  | H <sub>2</sub> O  | Am         | 1.00      | 1.333        |
| <b>Wattevillite</b>        |   |            |           |              |
| D. 763, H. 1 (3)           | Na <sub>2</sub> Ca(SO <sub>4</sub> ) <sub>2</sub> · 4H <sub>2</sub> O                           | Mc         | 1.81      | 1.459, 1.435 |
| <b>Wavellite</b>           |   |            |           |              |
| D. 639, Dl. 3 (1)          | Al <sub>3</sub> (OH, F) <sub>3</sub> (PO <sub>4</sub> ) <sub>2</sub> · 5H <sub>2</sub> O        | Or         | 2.35      | 1.552, 1.525 |
| <b>Wehrlite</b>            |   |            |           |              |
| D. 33, Dl. 4 (1)           | Bi <sub>2</sub> Te <sub>3</sub>   | Hx         | 7.55      | Op           |
| <b>Weibullite</b>          |   |            |           |              |
| Dl. 4 (1), DAp. 3          | Seleniferous var. of Galenobismutite  | ?          | 6.95      | Op           |
| <b>Weinschenkite</b>       |   |            |           |              |
| W. 140, MA. 2              | (Er, Yt)PO <sub>4</sub> · 2H <sub>2</sub> O   | Mc         | ?         | 1.61, 1.58   |
| <b>Weisbachite</b>         |   |            |           |              |
| MM. 21, MT.                | Barium-bearing var. of Anglesite  | Or         | 5.9       | ?            |
| <b>Weissite *</b>          |   |            |           |              |
| AJS. 13, ZK. 66R           | Cu <sub>5</sub> Te <sub>3</sub>   | ?          | 6.0       | Op           |
| <b>Wellsite</b>            |   |            |           |              |
| W. 40, 1, Dl. 2 (3)        | Barium-bearing var. of Phillipsite  | Mc         | 2.30      | 1.503, 1.498 |
| <b>Wenzelite</b>           |   |            |           |              |
| ZK. 60, MA. 3              | H(Fe, Mn, Mg)PO <sub>4</sub> · 2H <sub>2</sub> O  | Mc         | ?         | ?            |
| <b>Wernerite</b>           |   |            |           |              |
| D. 387, W. 345             | = Meionite + Marialite  | Tt         | 2.65      | 1.57, 1.56   |
| <b>Weslienite</b>          |   |            |           |              |
| W. 155, MA. 2              | Na <sub>3</sub> Ca <sub>2</sub> FeSb <sub>4</sub> O <sub>15</sub>                               | Is         | 4.95      | 2.21         |
| <b>Whewellite</b>          |   |            |           |              |
| D. 821, W. 90              | CaC <sub>2</sub> O <sub>4</sub> · H <sub>2</sub> O  | Mc         | 2.23      | 1.650, 1.490 |
| <b>Whitneyite</b>          |   |            |           |              |
| D. 39, AM. 14              | Mixture of Algodonite and Arsenical Copper  | —          | —         | —            |
| <b>Wiikite</b>             |   |            |           |              |
| W. 161, MA. 4              | Fe, Y, Sc, U, Nb, Ti, Si, O, H <sub>2</sub> O   | Or         | 4.2-5.1   | ?            |
| <b>Wilkeite</b>            |   |            |           |              |
| W. 406, DAp. 3             | 20CaO · CO <sub>2</sub> · 3P <sub>2</sub> O <sub>5</sub> · 3SO <sub>3</sub> · 3SiO <sub>2</sub> | Hx         | 3.25      | 1.655, 1.650 |
| <b>Willemite</b>           |   |            |           |              |
| D. 381, W. 163             | Zn <sub>2</sub> SiO <sub>4</sub>  | Hx         | 4.00      | 1.723, 1.694 |
| <b>Willyamite</b>          |   |            |           |              |
| DAp. 1, Dl. 4 (1)          | CoS <sub>2</sub> · NiSb <sub>2</sub>  | Is         | 6.85      | Op           |
| <b>Witherite</b>           |   |            |           |              |
| D. 279, H. 1 (3)           | BaCO <sub>3</sub>   | Or         | 4.30      | 1.677, 1.529 |
| <b>Wittichenite</b>        |   |            |           |              |
| D. 137, JWAS. 11           | Cu <sub>10</sub> Bi <sub>4</sub> S <sub>11</sub>  | Or         | 4.4       | Op           |
| <b>Wittite</b>             |   |            |           |              |
| Dl. 4 (1), MA. 2           | 5PbS · 3Bi <sub>2</sub> (S, Se) <sub>3</sub>  | Mc ?       | 7.10      | Op           |
| <b>Wodanite</b>            |   |            |           |              |
| MT., MA. 2                 | Titaniferous var. of Biotite  | —          | —         | —            |
| <b>Woehlerite</b>          |   |            |           |              |
| D. 333, W. 40              | CaSiO <sub>3</sub> + NaNbO <sub>3</sub> + NaFZrO <sub>2</sub>                                   | Mc         | 3.40      | 1.726, 1.700 |
| <b>Wolfachite</b>          |   |            |           |              |
| D. 103, Dl. 4 (1)          | Ni(As, Sb)S   | Or         | 6.40      | Op           |

\* The original Weissite was a mixture of alteration products of Cordierite.

| <i>Name and Reference.</i>                     | <i>Composition.</i>  | <i>Cr.</i> | <i>G.</i> | <i>N.</i>    |
|--|--|------------|-----------|--------------|
| <b>Wolfram Wolframite</b><br>D. 812, Dl. 4 (3) | Group name incl. Ferberite, and Huebnerite   | —          | —         | —            |
| <b>Wolfsbergite</b><br>Dl. 4 (1), MT.          | = Chalcostibite  | —          | —         | —            |
| <b>Wollastonite</b><br>D. 329, W. 197          | CaSiO <sub>3</sub>   | Mc         | 2.91      | 1.633, 1.618 |
| <b>Wulfenite</b><br>D. 818, Dl. 4 (3)          | PbMoO <sub>4</sub>   | Tt         | 6.75      | 2.41, 2.28   |
| <b>Wurtzite</b><br>D. 69, Dl. 4 (1)            | ZnS  | Hx         | 4.05      | 2.378, 2.356 |
| <b>Xanthiosite</b><br>H. 1 (4)                 | Ni <sub>3</sub> (AsO <sub>4</sub> ) <sub>2</sub>   | ?          | 4.95      | ?            |
| <b>Xanthoconite</b><br>D. 160, Dl. 4 (1)       | Ag <sub>3</sub> AsS <sub>3</sub>   | Mc         | 5.55      | 3            |
| <b>Xanthophyllite</b><br>D. 465, W. 384        | = Calcareous var. of Brandisite  | Mc         | 3.10      | 1.661, 1.649 |
| <b>Xanthosiderite</b><br>D. 260, MT.           | Impure Goethite  | —          | —         | —            |
| <b>Xenotime</b><br>D. 536, H. 1 (4)            | (Yt, Er)PO <sub>4</sub>  | Tt         | 4.60      | 1.815, 1.721 |
| <b>Xonotlite</b><br>W. 226, MA. 2              | 5CaSiO <sub>3</sub> · H <sub>2</sub> O   | Or         | 2.70      | 1.592 1.581  |
| <b>Xylotilite (Xylotile)</b><br>W. 228         | Ferruginous var. of Chrysotile   | Or         | 2.50      | 1.580, 1.555 |
| <b>Yttrialite</b><br>Dl. 2 (2), W. 232         | Fe''Y <sub>6</sub> Th(SiO <sub>4</sub> ) <sub>6</sub>  | Or ?       | 4.60      | 1.76         |
| <b>Yttrocalcite</b><br>W. 35, Dl. 4 (3)        | Ca <sub>5</sub> Y <sub>2</sub> F <sub>16</sub>   | Hx         | 3.20      | 1.45         |
| <b>Yttrocerite</b><br>D. 209, Dl. 4 (3)        | mCaF <sub>2</sub> · (Y, Ce)(F · OH) <sub>3</sub><br>Probably = Yttrofluorite                     | Is         | 3.55      | 1.435        |
| <b>Yttrocrasite</b><br>W. 161, Dl. 3 (1)       | CaO · 3Y <sub>2</sub> O <sub>3</sub> · ThO <sub>3</sub> · 17TiO <sub>2</sub> · 6H <sub>2</sub> O | Or         | 4.80      | 2.14         |
| <b>Yttrofluorite</b><br>W. 35, Dl. 4 (3)       | Ca <sub>5</sub> YF <sub>13</sub>   | Is         | 3.55      | 1.457        |
| <b>Yttrogummite</b><br>MT., D. 712             | U, Y, Si, O, H <sub>2</sub> O  | ?          | ?         | ?            |
| <b>Yttrotantalite</b><br>D. 528, Dl. 3 (1)     | YTaO <sub>4</sub>  | Or         | 5.7       | 2.15         |
| <b>Yttrotitanite</b><br>W. 219, Dl. 3 (1)      | = Keilhauite   | —          | —         | —            |
| <b>Yukonite</b><br>DAp. 3, MM. 17              | Ca, Fe, AsO <sub>4</sub> , H <sub>2</sub> O  | Am         | 2.8       | ?            |
| <b>Yuksporite</b><br>AM. 12, MA. 2             | Doubtful species. Related to Pectolite or Xonotlite  | —          | —         | —            |

| Name and Reference.                       | Composition.   | Cr. | G.   | N.             |
|---|--|-----|------|----------------|
| <b>Zamboninite</b><br>MA. 4, AM. 15       | $\text{CaMg}_2\text{F}_6$  | Or  | 3.00 | 1.411, 1.405   |
| <b>Zaratite</b><br>D. 303, H. 1 (3)       | $\text{Ni}_3(\text{OH})_4\text{CO}_3 \cdot 4\text{H}_2\text{O}$  | Am  | 2.63 | 1.58           |
| <b>Zeagonite</b><br>Dl. 2 (3), DAp. 2     | = Impure Phillipsite   | —   | —    | —              |
| <b>Zebedassite</b><br>W. 352, MA. 1       | $\text{H}_8\text{Mg}_5\text{Al}_2(\text{SiO}_4)_6$   | Or  | 2.20 | 1.52           |
| <b>Zeolite</b><br>D. 431, W. 386          | Group name incl. Analcite, Laumontite, Stilbite, Thomsonite, etc.  | —   | —    | —              |
| <b>Zeophyllite</b><br>W. 226, Dl. 2 (1)   | $\text{Ca}_4\text{F}_2(\text{SiO}_3)_3 \cdot 2\text{H}_2\text{O}$<br>* 1.545, Dl. 2 (1), p. 461.   | Hx  | 2.75 | 1.565, * 1.560 |
| <b>Zepharovichite</b><br>D. 613, W. 140   | = Wavellite or Variscite   | —   | —    | —              |
| <b>Zeunerite</b><br>D. 660, W. 143        | $\text{Cu}(\text{UO}_2)_2(\text{AsO}_4)_2 \cdot 12\text{H}_2\text{O}$  | Or  | 3.20 | 1.643, 1.623   |
| <b>Zincaluminite</b><br>D. 805, Dl. 4 (2) | $2\text{Zn}_3\text{Al}_3(\text{OH})_{11}(\text{SO}_4)_2 \cdot 7\text{H}_2\text{O}$   | Hx  | 2.25 | 1.534, 1.514   |
| <b>Zincite</b><br>D. 228, W. 41           | $\text{ZnO}$   | Hx  | 5.50 | 2.029, 2.013   |
| <b>Zincosite</b><br>D. 723, Dl. 4 (2)     | $\text{ZnSO}_4$  | Or  | 3.75 | 1.670, 1.658   |
| <b>Zinkenite</b><br>D. 114, Dl. 4 (1)     | $\text{PbSb}_2\text{S}_4$  | Or  | 5.25 | Op             |
| <b>Zinnwaldite</b><br>D. 461, W. 364      | $\text{H}_8\text{K}_2\text{Li}_4\text{Al}_2\text{Si}_6\text{O}_{22} +$<br>$\text{H}_4\text{K}_2\text{Fe}''_3\text{Al}_4\text{Si}_5\text{O}_{22} = \text{Var. of}$<br>Protolithionite | Mc  | 3.05 | 1.58, 1.55     |
| <b>Zippeite</b><br>W. 111, Dl. 4 (2)      | $2\text{UO}_3 \cdot \text{SO}_3 \cdot \text{H}_2\text{O}$  | Mc  | ?    | 1.730, 1.626   |
| <b>Zircon</b><br>D. 394, Dl. 3 (1)        | $\text{ZrSiO}_4$   | Tt  | 4.70 | 1.985, 1.925   |
| <b>Zirkelite</b><br>W. 67, Dl. 3 (1)      | $(\text{Ca}, \text{Fe})(\text{Zr}, \text{Ti}, \text{Th})_2\text{O}_5$  | Is  | 4.70 | 2.19           |
| <b>Zirklerite</b><br>Dl. 4 (3)            | $(\text{Fe}, \text{Mg})_9\text{Al}_4\text{O}_6\text{Cl}_{18} \cdot 3\text{H}_2\text{O}$  | ?   | 2.6  | 1.55           |
| <b>Zoisite</b><br>D. 406, W. 353          | $\text{HCa}_2\text{Al}_3\text{Si}_3\text{O}_{13}$  | Or  | 3.30 | 1.704, 1.698   |
| <b>Zorgite</b><br>D. 52, AM. 15           | Mixt. of Clausthalite and Umangite   | —   | —    | —              |
| <b>Zunyite</b><br>D. 369, W. 238          | $\text{Al}_8(\text{OH}, \text{F}, \text{Cl})_{12}(\text{SiO}_4)_3$   | Is  | 2.88 | 1.595          |
| <b>Zwieselite</b><br>D. 555, Dl. 3 (1)    | $\text{Fe}''_2\text{FPO}_4$  | Mc  | 3.70 | 1.7            |







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Title Key to Mineral groups  
Species & Varieties.

Author E.S. Simpson.

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